Korenix JetWave 2800 Series

Industrial Outdoor Wireless Access Point

User Manual

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About This Manual

This user manual is intended to guide professional installer to install the JetWave 2800 and how to build the infrastructure centered on it. It includes procedures to assist you in avoiding unforeseen problems.

Conventions

For your attention on important parts, special characters and patterns are used in this manual:

Note:

- This indicates an important note that you must pay attention to.

Warning:

- This indicates a warning or caution that you have to abide.

Bold: Indicates the function, important words, and so on.

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. To avoid the possibility of exceeding radio frequency exposure limits, you shall beep a distance of at least 100cm between you and the antenna of the installed equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination. The firmware setting is not accessible by the end user.

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Chapter 1 Introduction

Introduction

The JetWave 2800 is an industrial IEEE 802.11a/b/g/n Wireless AP which offers a high performance and reliability wireless solution for both 2.4GHz and 5GHz RF bands. With the JetWave 2800 wireless access point, a network designer will easily achieve the integration of wired and wireless networks. With the next generation 802.11n MIMO technology, the AP (up to 3 independent RF modules) offer high data link rate up to 350Mbps in each single radio options, and provide the redundant wireless connections to increase the reliability of the entire wireless network. The JetWave 2800 can function as an access, client, or bridge device.

The advanced features include Korenix patented super roaming technology which seamlessly enabling the applications of high-speed mobility, RSTP, VLAN, and QoS (WMM). For the wireless security communication, 64/128/152-bit WEP, WPA/WPA2/802.11i, enable/disable SSID broadcasts, MAC access control, IEEE 802.11X/RADIUS are supported. The JetWave 2800 provides an industrial level of immunity to electromagnetic interference and heavy electrical surges. The JetWave 2800 provides PoE compliant power inputs and it can be powered via PoE switch/injector through Ethernet cable. The IP67 waterproof enclosure (JetWave 2800) with wide -35~70°C operating temperature design allows users to install the device under harsh environmental conditions.

Appearance

Figure 1 JetWave 2800

Key Features

- Single/Dual/Triple RF Configurable: 802.11a/b/g/n and 2.4G/5G
- Superb performance: 3RF with 1GbE up to 350Mbps
- Strong TX output power extends distance and coverage
- High RX sensitivity enhances receiving signal quality
- 2x2 MIMO doubles data rate
- Supports Super Roaming, Mesh, and Mobility mode (2800-M)
- Supports high performance multiple hopping mode (2800-H)
- Wireless QoS (WMM) for video precedence transmission

- High gain weatherproof fiberglass antenna by selection
- Gigabit PoE power input, PoE injector included
- IP67 aluminum housing, -35~70°C outdoor solution

Typical Application

This section describes the typical applications of JetWave 2800. By default, it is set to AP mode which allows it to establish a wireless coverage; besides, it is also able to join any available wireless network under wireless client mode. The JetWave 2800 is able to deliver stable and efficient broadband connectivity for various applications.

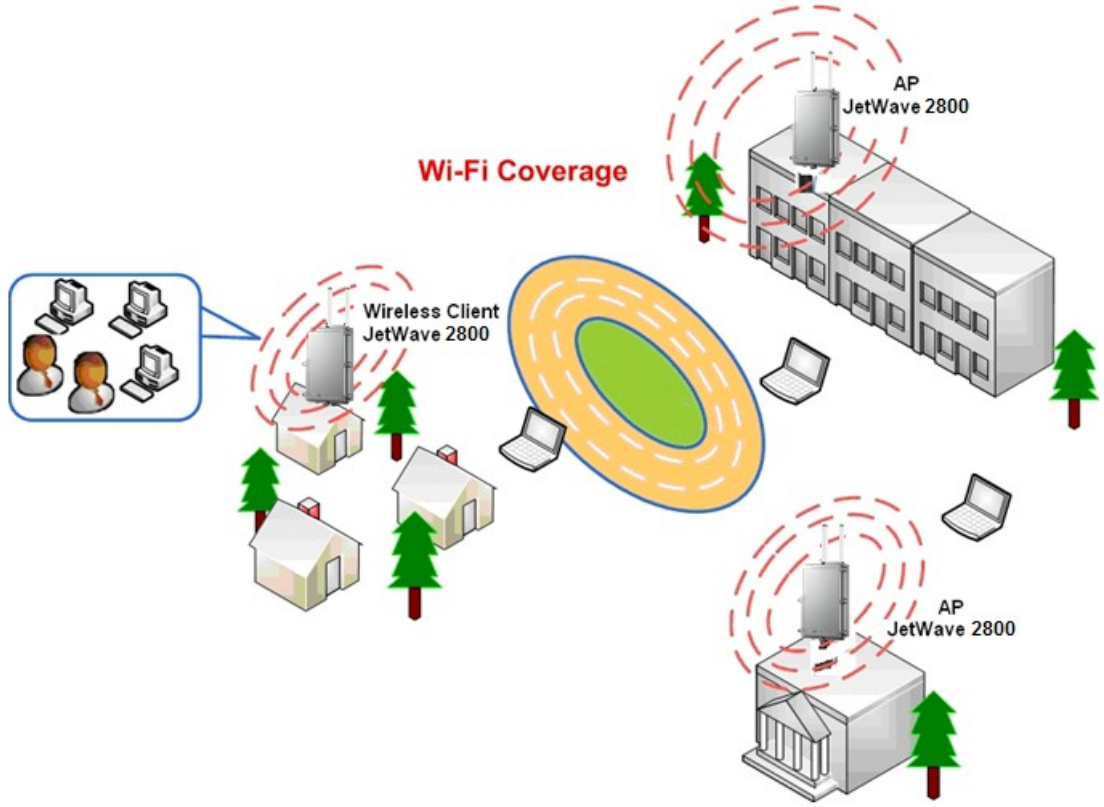


Figure 2 Typical Application

Besides, the JetWave 2800 can also be applied into the following environments:

- Cost-effectively provide long distance backhaul for remote areas (e.g. village, oil well, island, mountain and etc.)
- Establish local backhaul for campus, farm and factory
- Provide and access for video streaming or surveillance for industrial and mining enterprises

Chapter 2 Hardware Installation

This chapter describes safety precautions and product information you have to know and check before installing JetWave 2800.

Preparation before Installation

Professional Installation Required

1. Please seek assistance from a professional installer who is well trained in the RF installation and knowledgeable in the local regulations.
2. The JetWave 2800 is distributed through distributors and system installers with professional technicians and will not be sold directly through retail stores.

Safety Precautions

1. To keep you safe and install the hardware properly, please read and follow these safety precautions.
2. If you are installing JetWave 2800 for the first time, for your safety as well as others', please seek assistance from a professional installer who has received safety training on the hazards involved.
3. Keep safety as well as performance in mind when selecting your installation site, especially where there are electric power and phone lines.
4. When installing JetWave 2800, please note the following things:
   - Do not use a metal ladder;
   - Do not work on a wet or windy day;
   - Wear shoes with rubber soles and heels, rubber gloves, long sleeved shirt or jacket.
5. When the system is operational, avoid standing directly in front of it. Strong RF fields are present when the transmitter is on.

Installation Precautions

To keep the JetWave 2800 well while you are installing it, please read and follow these installation precautions.

1. Users MUST use a proper and well-installed surge arrestor and grounding kit with JetWave 2800; otherwise, a random lightening could easily cause fatal damage to JetWave 2800. **EMD (Lightning) DAMAGE IS NOT COVERED UNDER WARRNTY.**
2. Users MUST use the safety certificated PoE switch/injector with the JetWave 2800. The Industrial PoE Switch is recommended.
3. Users MUST power off the JetWave 2800 first before connecting the external antenna to it; otherwise, damage might be caused to the JetWave 2800 itself.

Product Package

The product package you have received should contain the following items. If any of them are not included or damaged, please contact your local vendor for support.

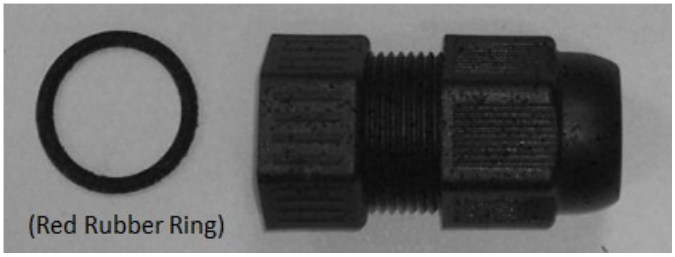
- JetWave 2800 ×1
- Pole Mounting Kit ×1
- Waterproof Cap for RJ-45 ×1
- Quick Installation Guide ×1
- Product CD ×1

Note:

- Product CD contains Quick Installation Guide and User Manual!

Pole Mounting kit

Waterproof Cap for RJ-45



Warning:

- Users MUST use the safety certificated PoE Switch/Injector with the JetWave 2800. Use of other non-safety certificated PoE Switch/Injector is easier to cause damage in the field environment.

Hardware Installation

Connect up

1. Connect the Ethernet cable to the Ethernet Port in the bottom of the JetWave 2800. The Ethernet port is an IEEE 802.3at compliant PoE port.

Figure 3 The Ethernet port in the bottom of the AP.

2. To have better waterproof protection outside, please follow the below step to install the Waterproof Cap for RJ-45.

   Step 1: Insert the Ethernet Cable to the Waterproof Cap for RJ-45. You may re-assemble the RJ-45 connector to insert the cap, make sure the cable distance from the PoE switch to the AP. Check the cable connection is correct before installed it in the field.

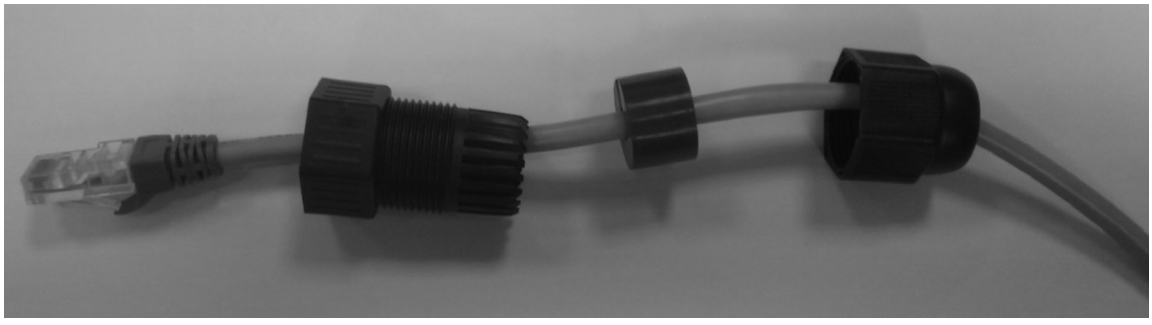


Figure 4 Assemble the Ethernet Cable

   Step 2: Put the red rubber ring to the RJ-45 connector first. Plug the Ethernet Cable into the RJ-45 port. Note that the CAT 5E/6 cable is recommended.

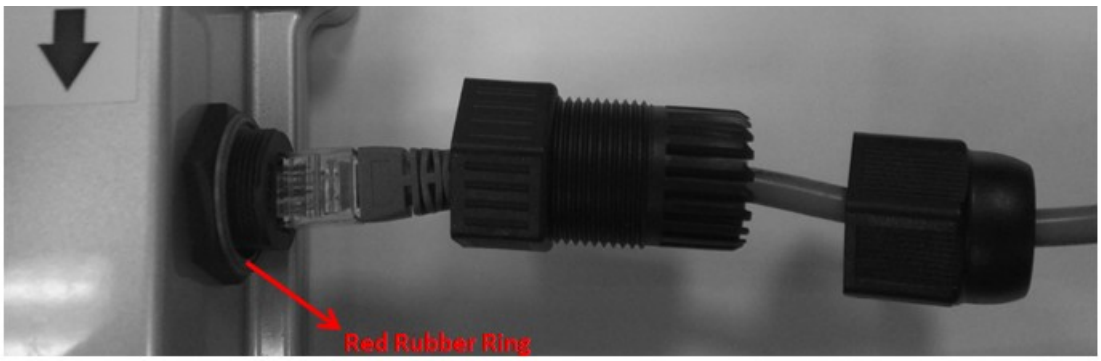


Figure 5 Connect to the RJ-45 connector

Step 3: Lock the Waterproof Cap for the RJ-45 port.

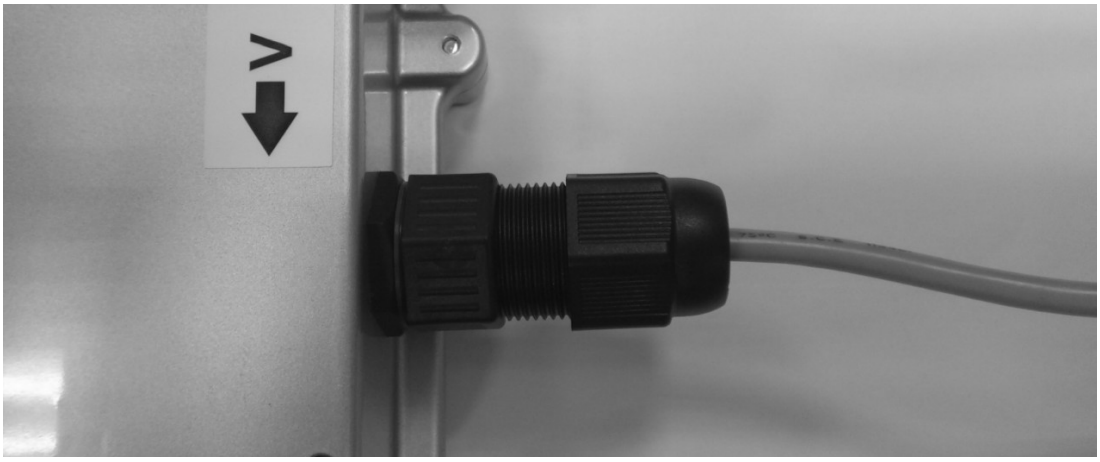


Figure 6 The Ethernet Cable is well installed.

3. Connect another end of the Ethernet cable to the PoE Switch or PoE Injector. Then the AP can be powered and user can access its management interface through the cable. Below figure is an example of Connect AP to the PoE Switch.

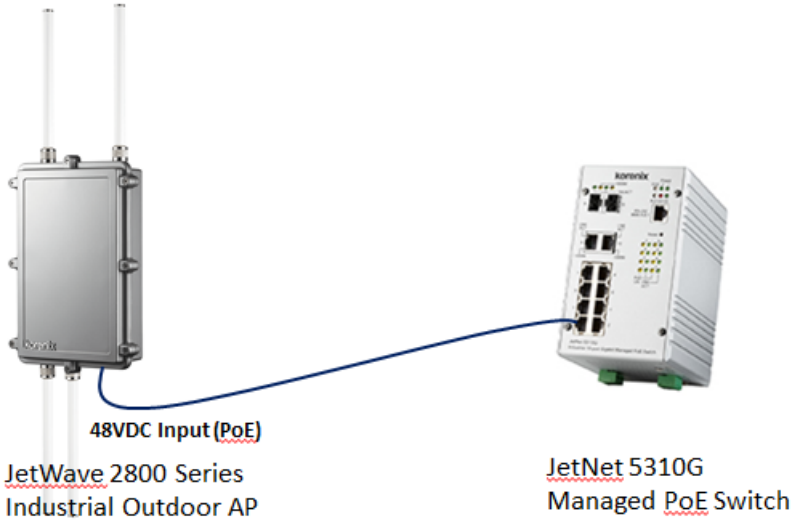


Figure 7 Example of Connect AP to the PoE Switch

Note:

- The AP does not provide PoE injector inside the box.
- Please choose Korenix Industrial IEEE 802.3at compliant PoE Switch as power input source. Thus Korenix can provide better quality assurance for your network.

Pole Mounting

1. The unassembled bracket consists as below. If there is any lost, please contact your sales.

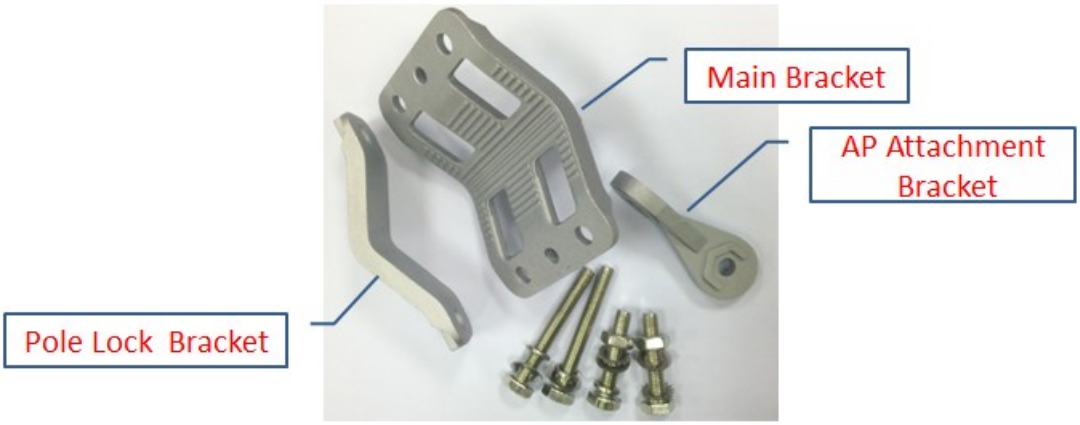


Figure 8 Pole Mounting Kit

2. Following steps show how to assemble the pole mounting kits.

Step 1: Assemble the Main Bracket and AP Attachment Bracket.

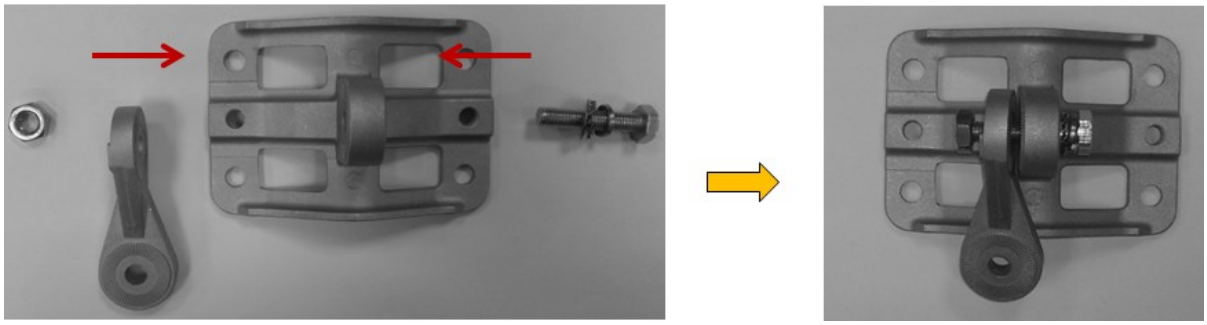


Figure 9 Pole Mounting – Main Bracket with AP Attachment Bracket

Step 2: Assemble the Main Bracket and Pole Lock Bracket. (Note: The step is usually assembled in the field after confirmed the installation place.)

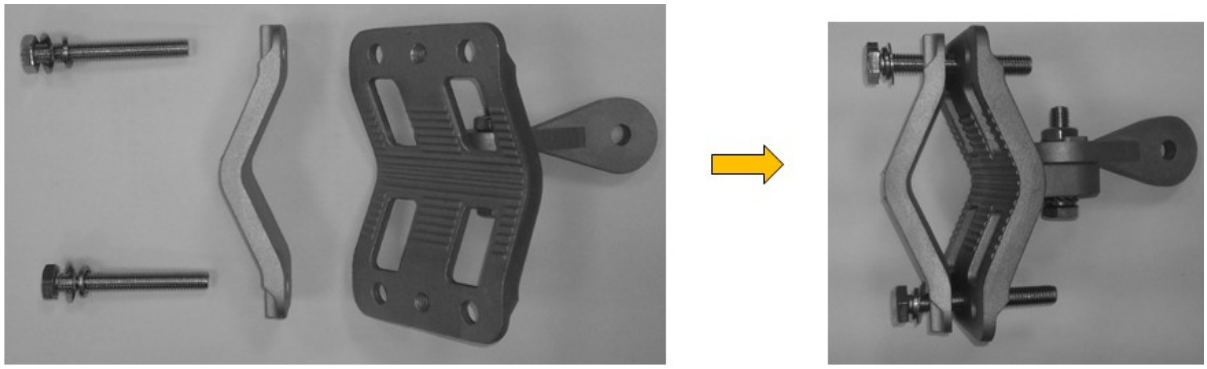


Figure 10 Pole Mounting – Main Bracket and Pole Lock Bracket

3. Mount the AP to the AP Attachment Bracket.

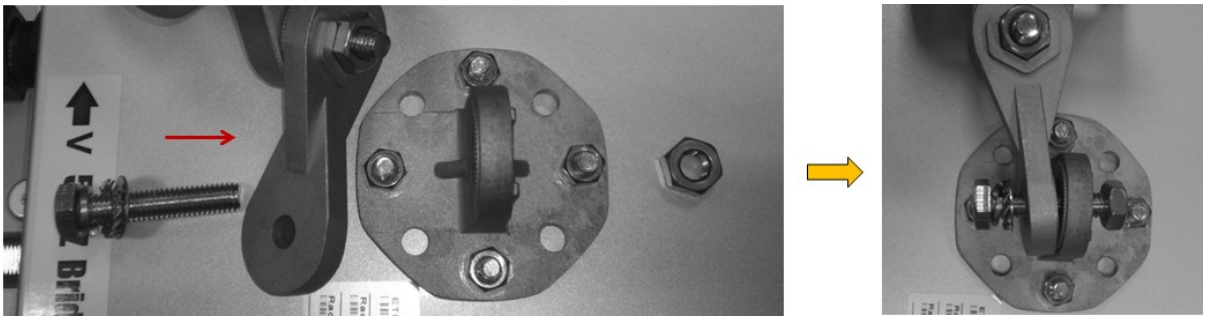


Figure 11 Mount the AP with AP Attachment Bracket

4. Pole mounting the AP in the field. Below figure shows you have completed the hardware installation of JetWave 2800.

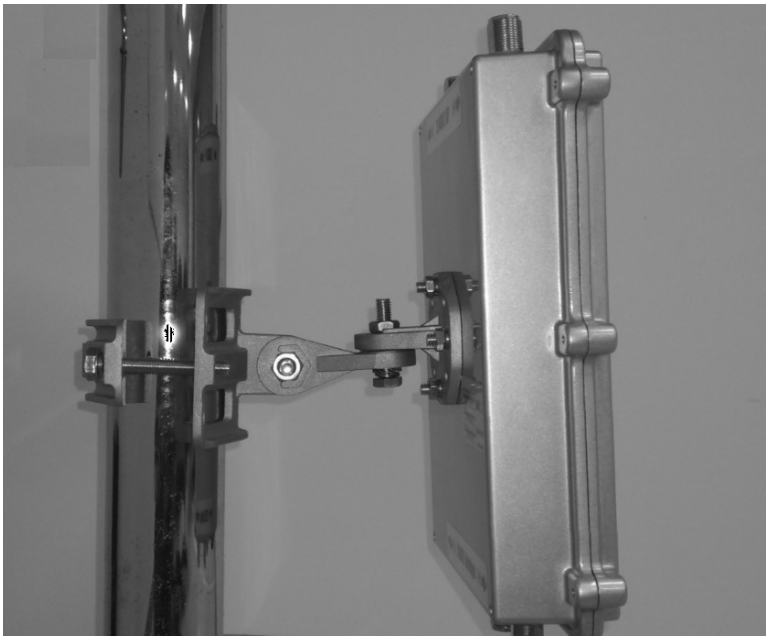
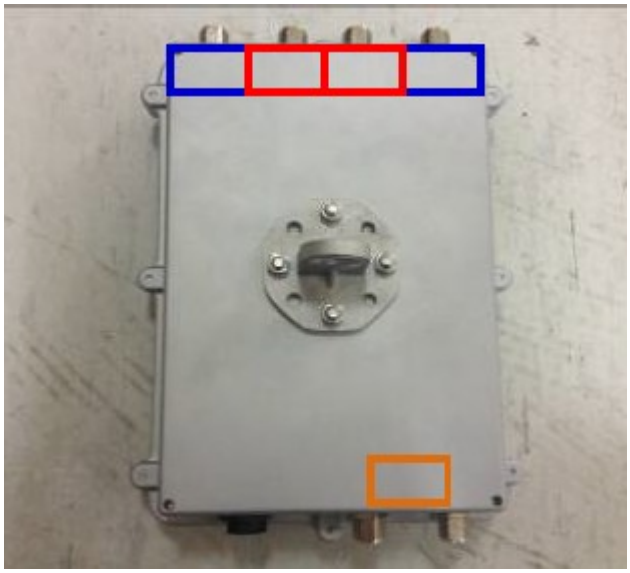


Figure 12 Pole Mounting the Access Point

Using the External Antenna

Consult your system integrator or our technical support engineer to choose the suitable external antenna with N-type connector for your application. Different antenna supports different bands and different range of coverage. There are indication labels shows which radio the antenna socket belongs to. JetWave 2800 supports maximum 3 Radio cards, please connect your antenna correctly and configure the band and settings for each of them



Blue block: The antenna of the Radio 1;

Orange block: The antenna of the Radio 2

Red block: The antenna of the Radio 3.

Note:

- When prepare the external antenna, make sure the antenna can support Dual Polarization. Most of the high gain antenna supports Dual Polarization. Connect the V polarization of antenna to V polarization of the AP. The H polarization of antenna to H polarization of the AP.
- Some of the low gain or Omni antenna may not support Dual Polarization, you can connect 2 the same dbi gain antennas to V and H polarization.

The below figures show the steps to connect the antenna to the antenna sockets.

Connect your antenna with the N-type connector here.

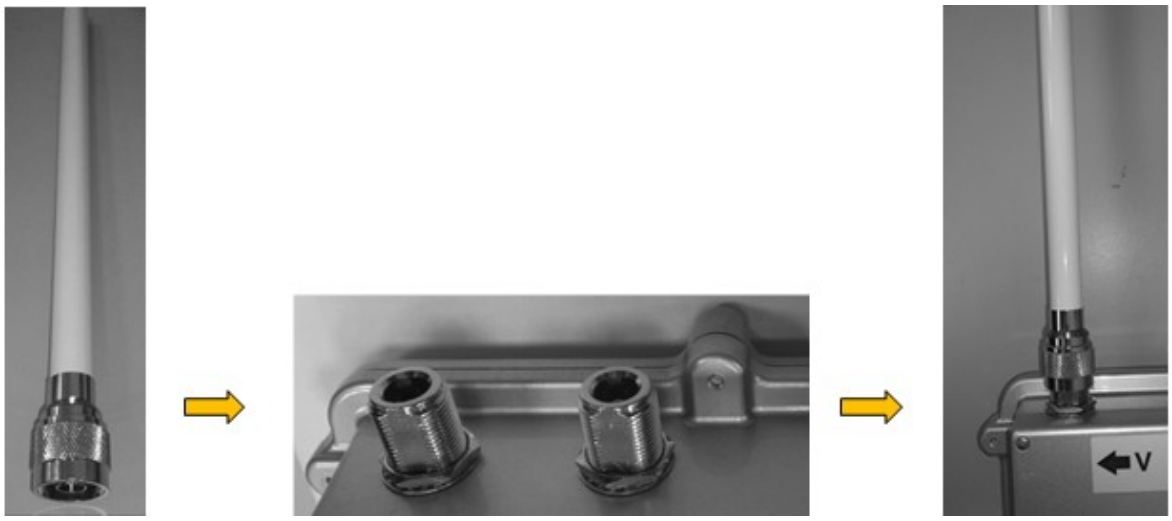


Figure 13 Example of the Connect external Antenna socket: Connect the Omni-Directional Antenna to the Antenna Socket.

Note:

- Most of high gain external antenna is installed in higher place than AP, get low power lost antenna cable in advance.
- Be aware of the force you use while connecting to the N-type connector, inappropriate force may damage the N-type connector!

Warning:

- Users MUST power the JetWave 2800 off first before connecting the external antenna to it; otherwise, damage might be caused to the JetWave 2800 itself.

Chapter 3 Web Settings

The Web Setting is applied to JetWave 2700/2800 Series.

The MESH and Roaming features are applied to specific models. The JetWave 2700/2800-M means MESH mode, it supports wireless Mesh network and Fast Roaming feature.

Factory Default Settings

We'll elaborate the JetWave 2800 factory default settings. You can re-acquire these parameters by default. If necessary, please refer to the "Administration".

Table 1 JetWave 2800 Factory Default Settings

Features		Factory Default Settings
Username		admin
Password		admin
Language		English
Device Name		FSA
System Operation Mode		Bridge
IP Setup	IP Address	192.168.1.1
	Subnet Mask	255.255.255.0
	Gateway	0.0.0.0
	Primary DNS Server	0.0.0.0
	Secondary DNS Server	0.0.0.0
Spanning Tree Protocol		Off
Ethernet Link Speed		Auto
DHCP Server		Off
Management VLAN		0 (Disable)
Radio Setup Radio - 1/2	Wireless Band	802.11ng HT20
	Channel	Radio 1: 1 CH - 2412MHz Radio 2: 6 CH - 2473MHz
	Transmission Power	Full
	Antenna Number	2
	Short Guard Interval	On(400ms)
	Aggregation	Enable
	Distance (x100m)	0
WLAN Setup Radio-1/2	SSID	Radio 1: wireless_1 Radio 2: wireless_2 (Broadcast Enable)
	Enable	Yes
	WLAN Mode	Access Point

	RTS	2312
	Fragmentation	2346
	Limited Data Rate	Auto
	Multicast Rate	Auto
	Rate Adaption	Default
	VLAN	ID: 0, Priority: 0
	Client Numbers	64
	Client Isolation	Off
	Bandwidth Profile	0-Disable
Wireless Security	SSID	wireless_1
	MAC Filter	Disable
	Security	Disable
MESH Setup		Disable
WMM Setup	Radio	Radio 1
	Enable	NO
Bandwidth Control Profile Setup	Profile ID	1
	Mode	Disable
SNMP		Disable
System Log	Syslog Level	Informational
	Remote logging	Diable
	Remote IP	0.0.0.0
Certificate management		Empty

System Requirements

Before configuration, please make sure your system meets the following requirements:

- A computer coupled with 10/100/1000 Base-T(X) adapter;
- Configure the computer with a static IP address of 192.168.1.x, as the default IP address of JetWave 2800 is 192.168.1.1 (X cannot be 0, 1, nor 255);
- A Web browser on PC for configuration such as Microsoft Internet Explorer 6.0 or above, Netscape or Firefox.

How to Login the Web-based Interface

The JetWave 2800 provides you with user-friendly Web-based management tool.

- Open IE and enter the IP address (Default: **192.168.1.1**) of JetWave 2800 into the address field. You will see the WELCOME page as below.

- Select the Login, then the login screen will appear as below.

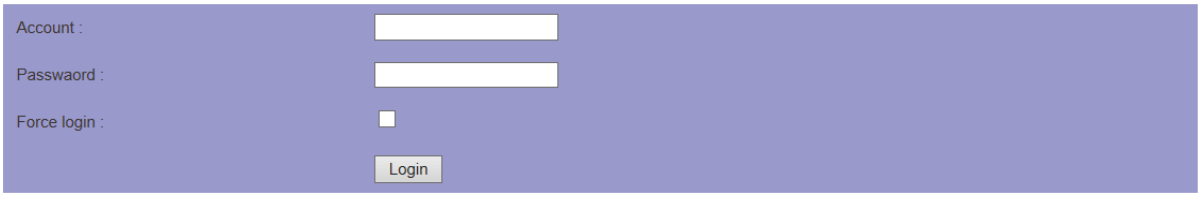


Figure 4 Login Page

- Enter the name of Account (Default: **admin**) and password (Default: **admin**) respectively and click "**Login**" to login the main page of JetWave 2800. As you can see, this management interface provides main options in the above, which are **Home**, **System Setup**, **Wireless**, **Administrator**, **Utility**, **Status** and **Logout(admin)**.

Figure 5 Main Page

Note:

- The username and password are case-sensitive!

System Setup

For users who use the JetWave 2800 for the first time, it is recommended that you begin configuration from "**System Setup**" shown below:

In **System Setup** page, there are 2 configuration pages, **Basic Setup** and **Network Setup**.

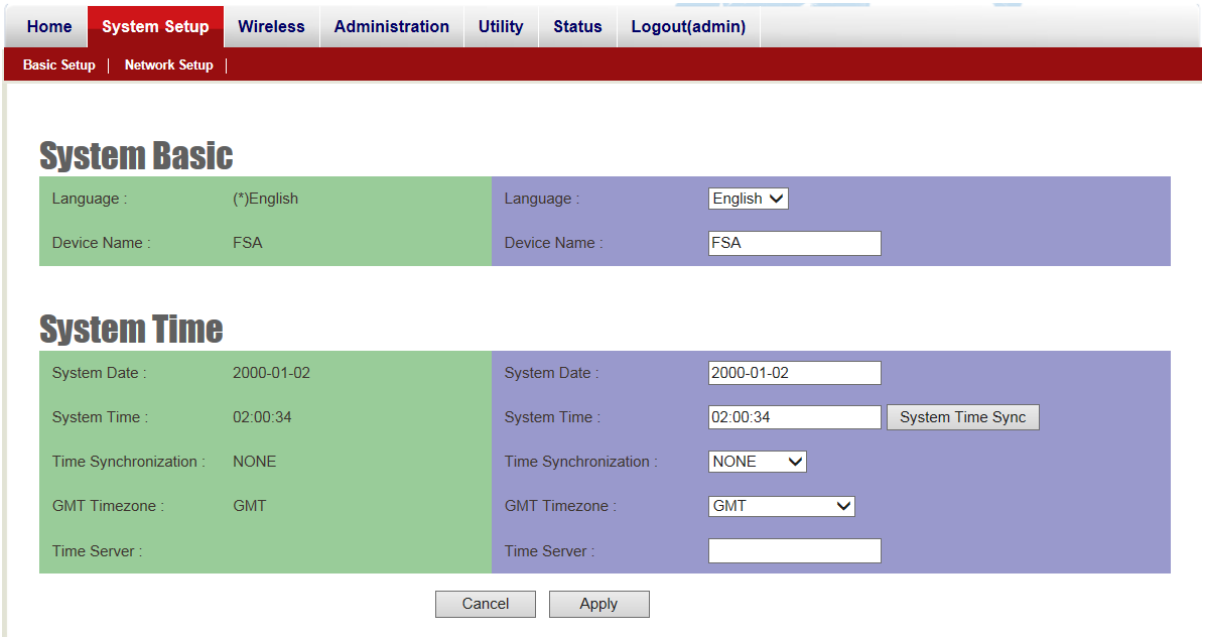


Figure 6 Basic System Settings

Basic Setup:

- **System Basic**

  Language: The AP support English language currently.

  Device Name: User could give a name for identifying a particular outdoor access point in here.

- **System Time**

  System Date: User would like to set the date manually in this item.

  System Time: User would like to set the time manually in this item.

  Time Synchronization: Time synchronization setting will decide the duration to next time synchronization. When any NTP server is available in network, user can enable the NTP and system will automatically synchronize system time with NTP server.

  GMT Time zone: Set a Greenwich Mean Time setup for time synchronization.

  Time Server: User can insert an available IP address of NTP server in Internet for time synchronization.

Network Setup:

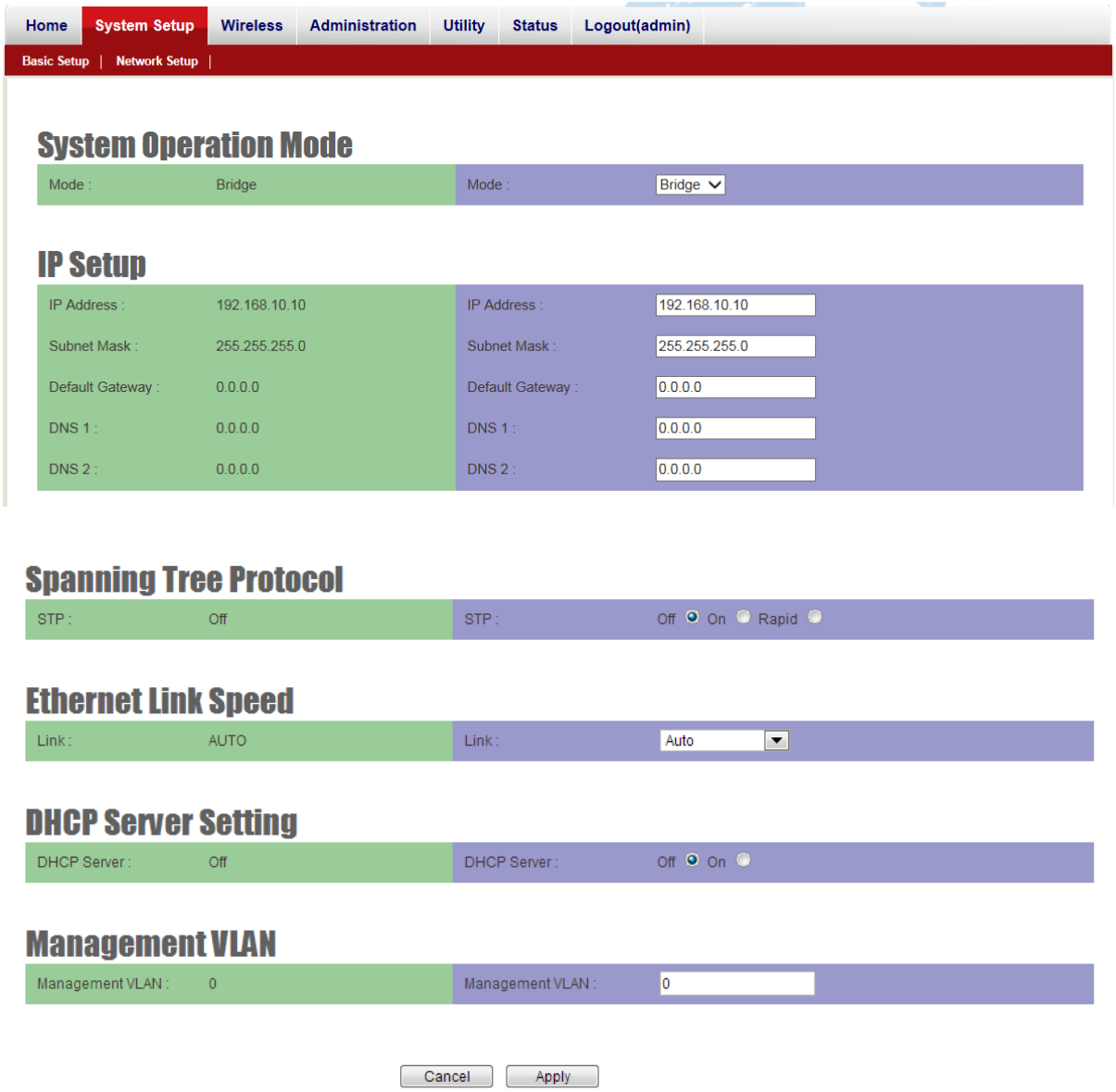


Figure 77 Network Setup

- **System Operation Mode: Bridge or Router** (The default value is Bridge mode)

  Bridge: When configured to Bridge mode, the AP acts as bridge to transmit/receive traffic between LAN to Wireless LAN. And there is only one IP address available for the system.

  Router: When configured to Router mode, the AP acts as Router, the LAN and Wireless LAN will be separated to different network. See **Router Mode – WAN/LAN Setup** for detail configuration.

- **Bridge Mode - IP Setup**

  IP Address: Once **Static IP** was selected, the IP Address field will allow you to set the bridge device IP address manually. This IP address of the bridge is used as the base for all of your local

network settings.

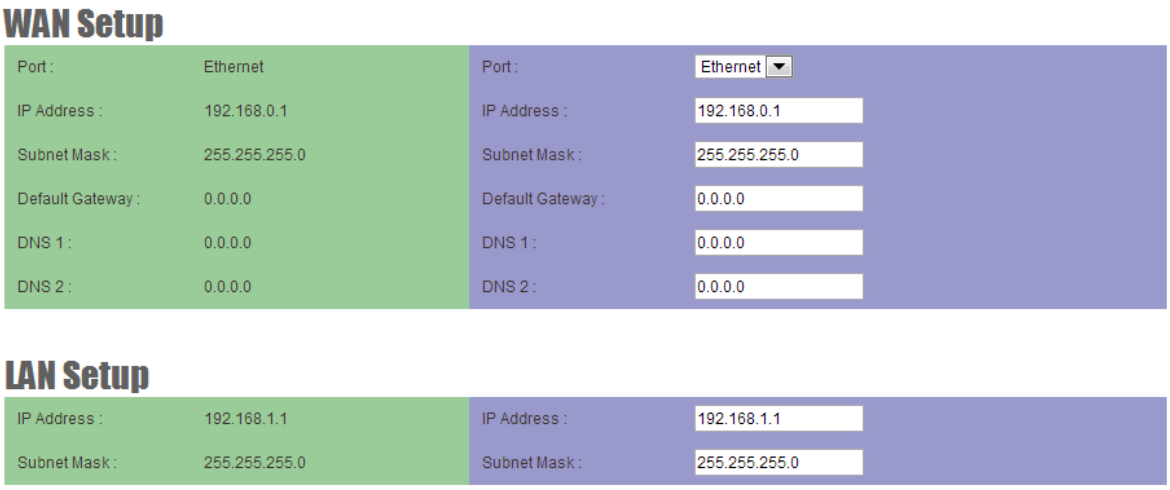
Subnet Mask: This is the subnet mask address for your bridge device. Set the IP subnet mask manually.

Default Gateway: Set the default gateway IP address manually.

DNS 1 & 2: The Domain Name System (DNS) is how the Internet translates domain or website names into Internet addresses or URLs. Your ISP will provide you with at least one DNS Server IP Address. If you wish to use another, enter that IP Address in **DNS 2** field.

- **Router Mode - WAN/LAN Setup**

When configured the System Operation Mode to Router mode, the Web interface shows below 2 new configuration fields.



WAN Setup: The page allows you to configure the IP Address, Subnet Mask, Default Gateway and DNS 1/2 for the WAN Port. While the WAN Port is **Ethernet** port, the settings will be applied to the Ethernet RJ-45 port.

Note: If your PC is not located within the same IP subnet of the WAN port, please remember to modify your PC's IP address to re-connect the AP.

LAN Setup: The page allows you to change the IP address, Subnet Mask for the LAN.

Click **Apply** after configured the new settings. The new settings are activated immediately after you applied.

- **Spanning Tree Protocol**

The Spanning Tree Protocol (STP) is a network protocol that ensures a loop-free topology for any bridged Ethernet local area network. The basic function of STP is to prevent bridge loops and ensuing broadcast radiation. Spanning tree also allows a network design to include spare

(redundant) links to provide automatic backup paths if an active link fails, without the danger of bridge loops, or the need for manual enabling/disabling of these backup links.

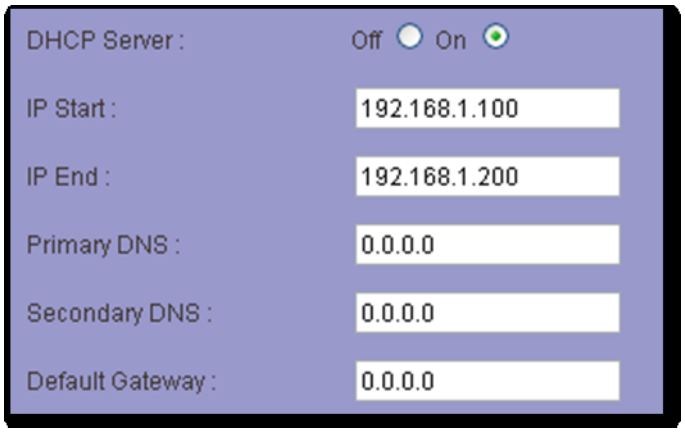
This setting allows you to configure STP **ON**, **OFF** or **Rapid** STP mode.

- **Ethernet Link Speed**

Link The link speed of Ethernet port can be changed manually into 10/100 Half/Full duplex.

- **DHCP Server Setting**

The AP can be configured as a DHCP server for a LAN network. Once the DHCP Server is chose as on, the DHCP server setting elements will spread out on the page.



DHCP Server: Allows you to enable or disable the DHCP server function in system.

IP Start / End: The IP Start and End Address specify the range of addresses assigned by your device when it functions as a DHCP server.

Primary & Secondary DNS Set the primary and secondary DNS server IP address which DHCP server is going to assign for DHCP client devices.

Default Gateway Default gateways IP address assign for DHCP client devices.

- **Management VLAN**

Management VLAN is a secure VLAN which divides Internet users from device IP access. Administrators can management network devices under the Management LAN network without betrayal of secrets.

Wireless Settings

Open “**Wireless**” as below to make basic wireless configuration.

There are several settings such as the **Radio Setup**, **WLAN Setup**, **Wireless Security**, **MESH Setup**, **WMM Setup** and **Bandwidth Control** can be configured in the Wireless Configuration.

Radio Setup

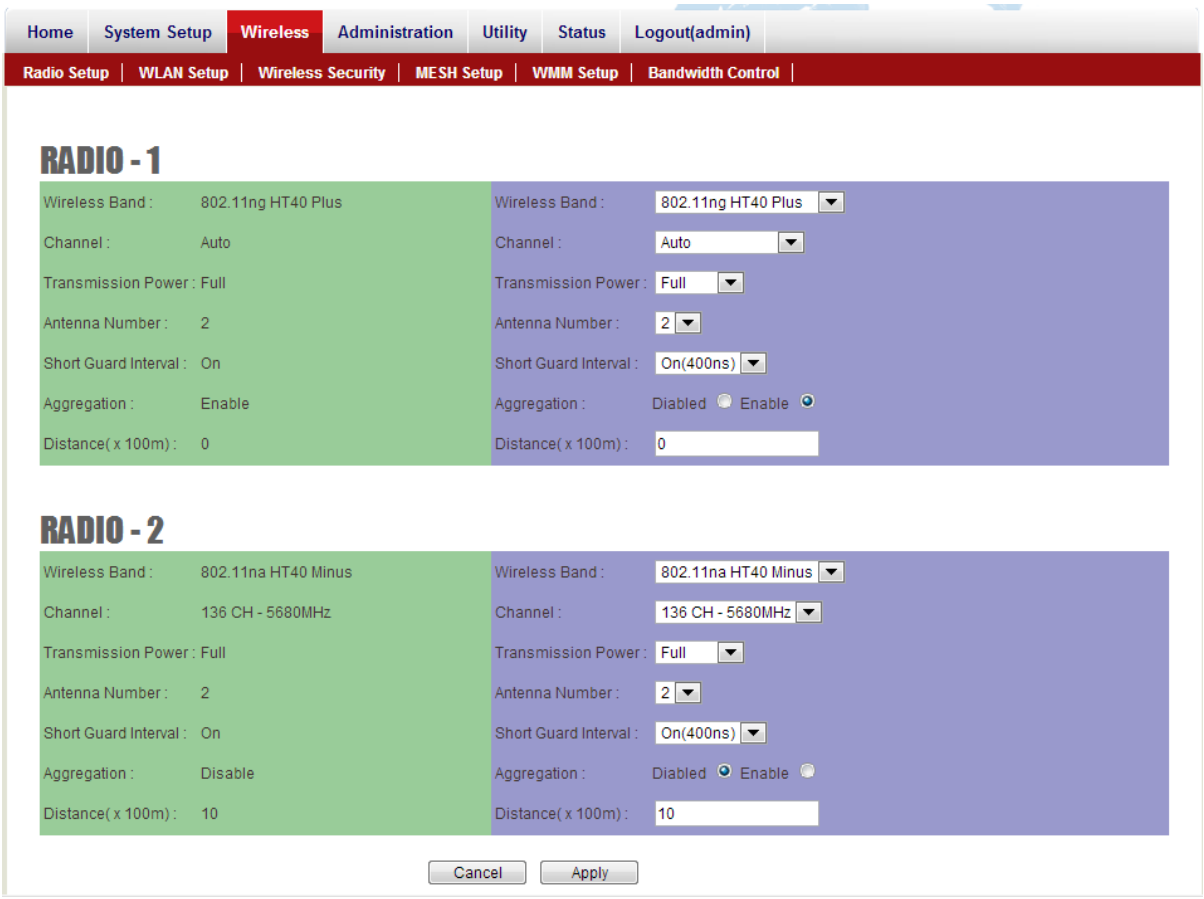

Home
System Setup
Wireless
Administration
Utility
Status
Logout(admin)
Radio Setup | WLAN Setup | Wireless Security | MESH Setup | WMM Setup | Bandwidth Control |
RADIO - 1
Wireless Band : 802.11ng HT40 Plus
Channel : Auto
Transmission Power : Full
Antenna Number : 2
Short Guard Interval : On
Aggregation : Enable
Distance(x 100m) : 0
Wireless Band : 802.11ng HT40 Plus
Channel : Auto
Transmission Power : Full
Antenna Number : 2
Short Guard Interval : On(400ns)
Aggregation : Diabled Enable
Distance(x 100m) : 0
RADIO - 2
Wireless Band : 802.11na HT40 Minus
Channel : 136 CH - 5680MHz
Transmission Power : Full
Antenna Number : 2
Short Guard Interval : On
Aggregation : Disable
Distance(x 100m) : 10
Wireless Band : 802.11na HT40 Minus
Channel : 136 CH - 5680MHz
Transmission Power : Full
Antenna Number : 2
Short Guard Interval : On(400ns)
Aggregation : Diabled Enable
Distance(x 100m) : 10
Cancel
Apply

Figure 8 Wireless Settings

Wireless Band Choose a radio frequency for signal transmission. The frequency and channel bandwidth match to selection is showed as following table:

Selection	Frequency	Channel Band Width
802.11G	2.412 GHz - 2.462 GHz	20 MHz
802.11NG HT20	2.412 GHz - 2.462 GHz	20 MHz
802.11NG HT40 Plus	2.412 GHz - 2.442 GHz	40 MHz
802.11NG HT40 Minus	2.432 GHz - 2.462 GHz	40 MHz
802.11A	5.18 GHz - 5.32 GHz 5.50 GHz - 5.58 GHz 5.66 GHz - 5.70 GHz 5.745 GHz - 5.825 GHz	20 MHz
802.11NA HT20	5.18 GHz - 5.32 GHz 5.50 GHz - 5.58 GHz 5.66 GHz - 5.70 GHz 5.745 GHz - 5.825 GHz	20 MHz
802.11NA HT40 Plus	5.18 GHz - 5.30 GHz 5.50 GHz - 5.54 GHz 5.66 GHz 5.745 GHz - 5.785 GHz	40 MHz
802.11NA HT40 Minus	5.20 GHz - 5.32 GHz 5.52 GHz - 5.56 GHz 5.68 GHz 5.765 GHz - 5.805 GHz	40 MHz

Channel Available channel will relate to what wireless band is chosen.

Transmission Power Control the transmit power of a radio by selection of Transmission Power.

Antenna Number The JetWave 2800 series complete 802.11n 1x1 1-steram and 2x2 2-stream for antenna attached. The maximum data link rate at 1-steram and 2-stream will be 130Mbps and 300Mbps.

Short Guard Interval The guard interval is the space between symbols (characters) being transmitted. Adding time between symbol transmissions allows these echoes and reflections to settle in before the next symbol is transmitted. In normal 802.11 operations, the guard interval is 800ns. A short guard interval will short the time between symbol transmissions into 400 ns to enhance the efficiency of data transmission.

Aggregation Frame aggregation is a feature of the 802.11n wireless LAN standards that increases throughput by sending two or more data frames in a single transmission.

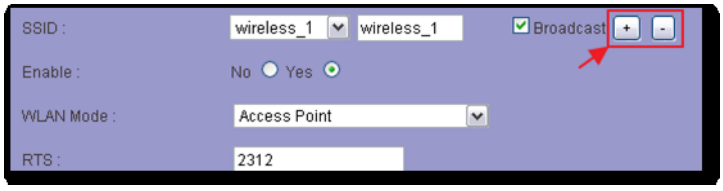
Distance To assign a distance between nodes in a point to point transmission will improve the success rate of data transmit.

WLAN Setup

Home
System Setup
Wireless
Administration
Utility
Status
Logout(admin)
Radio Setup | WLAN Setup | Wireless Security | MESH Setup | WMM Setup | Bandwidth Control |
RADIO-1 WLAN Setup
SSID : wireless_1 Broadcast
Enable : Yes
WLAN Mode : Access Point
RTS : 2312
Fragmentation : 2346
Data Rate : Auto (Limited)
Multicast Rate : Auto
Rate Adaptation : Default
VLAN : ID :0 Priority :0
Client Numbers : 64
Client Isolation : Off
Bandwidth Profile : 0-Disable
SSID : wireless_1 wireless_1 Broadcast + -
Enable : No Yes
WLAN Mode : Access Point
RTS : 2312
Fragmentation : 2346
Limited Data Rate : Auto 0 kbps Fixed
Multicast Rate : Auto
Rate Adaptation : Default
VLAN : ID : 0 Priority : 0
Client Numbers : 64
Client Isolation : Off On
Bandwidth Profile : 0-Disable Edit Bandwidth Profile

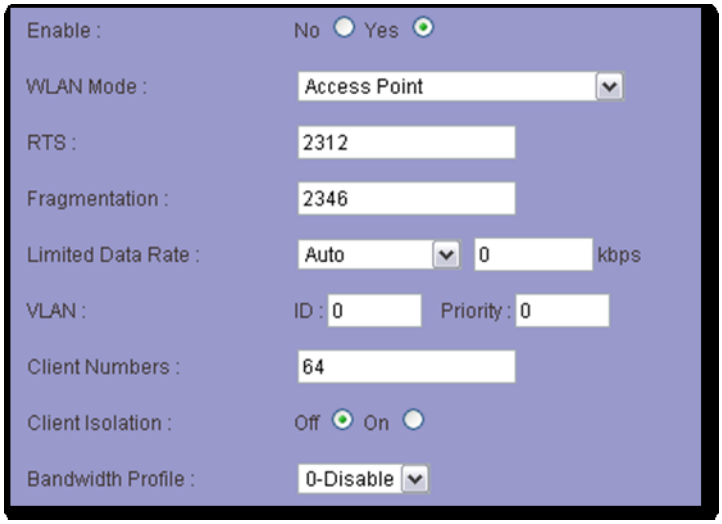
Figure 99 Wireless Settings

Each physical radio interface supports up to 16 virtual WLAN AP setting. User can add or delete a virtual AP by click the “+” or “-” button on top of the very right side of setting block.



SSID A service set identifier (SSID) is a name that identifies a particular 802.11 wireless LAN. A client device receives beacon messages from all access points within range advertising their SSIDs. The client device can then either manually or automatically select the network with which to associate.

Broadcast Network administrator can choose broadcast beacon messages of a virtual AP by checking the broadcast block.


Enable : No Yes
WLAN Mode : Access Point
RTS : 2312
Fragmentation : 2346
Limited Data Rate : Auto 0 kbps
VLAN : ID : 0 Priority : 0
Client Numbers : 64
Client Isolation : Off On
Bandwidth Profile : 0-Disable

Enable Network administrator can also decide functioning of virtual AP or let it idle.

WLAN Mode Radios support “Access Point”, “Wireless Station”, “Access Point (WDS Support)” and “Wireless Station (WDS Support)” mode to meet various network scenarios.

RTS “Request to send” is the optional mechanism used by the 802.11 wireless networking protocol to reduce frame collisions introduced by the hidden node problem. Set the packet size to trigger RTS/CTS enable. This is normally set in AC side only because the hidden station problem does not exit from the perspective of the AP. RTS Threshold can be set between 1 and 2312 bytes.

Fragmentation Set the packet size to activate fragmentation. Fragmentation threshold can be set between 1 and 2312 bytes.

Note: Fragmentation setting will be automatically disabled, once the frame aggregation is enabled.

Limited Data Rate Limit the wireless data link rate to enhance the stability of data transmission.

VLAN ID In order to create a wireless VLAN environment, each virtual AP can conform to an 802.1Q VLAN tag ID.

VLAN Priority Each VLAN ID can be gave a priority number (from 0 to 7) for data process priority.

Client Numbers Limit the maximum number of associate client devices.

Client Isolation Client isolation will protect the privacy of each connecting client from searching in a wireless LAN.

Bandwidth Profile Choose a bandwidth control profile for virtual AP interface. (About the detail of bandwidth profile, please refer to the bandwidth control setup in coming pages.)

Wireless Security

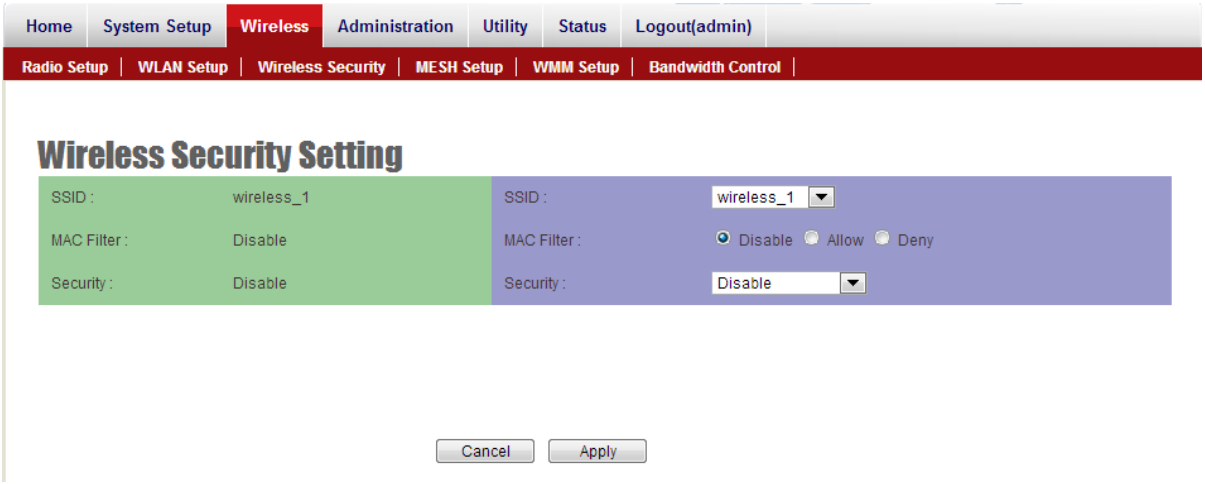
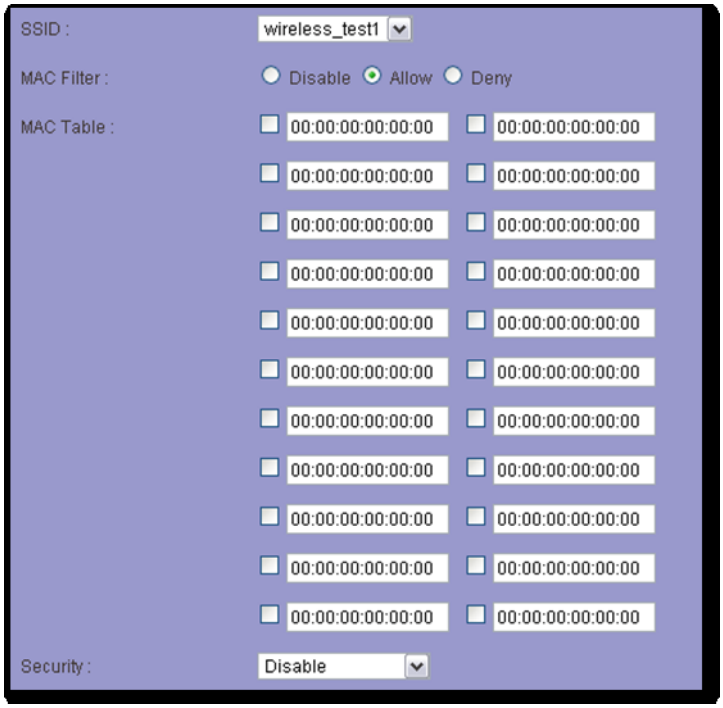


Figure 10 Wireless Security Settings

SSID User can choose a specific virtual AP to assign a security type of wireless link.

MAC Filter MAC filter provides allow or deny MAC table for administrator to access control of AP by insert a MAC address of client device. When running allow mode, only the MAC address which showing on the table will be accept for wireless connectivity. When running deny mode, MAC address which showing on the table will be blocked from wireless connectivity. The table can be configured 32 MAC address at most of each virtual AP interface.



Security Comprehensive security settings are available on system in this menu. These include

WEP Keys and WPA+WPA2-PSK. Details of each type of security are in appendix. The security settings are independent between each virtual AP interface.

WEP System supports 64-bit, 128-bit and 152-bit WEP key in both ASCII and HEX format. Do make sure the correctly number of digits/characters and format of WEP key as shown in the table are entered. Note that in HEX format, HEX number cannot start with “0”.

Number of digit/character	ASCII	HEX
64-bit	5	10
128-bit	13	26
152-bit	16	32

WPA+WPA2-PSK The AP support WPA+WPA2-PSK (WPA-Personal) in security. WPA+WPA2-PSK (Pre-shared key) mode is designed for home and small office networks and doesn't require an authentication server. Each wireless network device authenticates with the access point using the same 256-bit key.

TKIP Temporal Key Integrity Protocol: A 128-bit per-packet key is used, meaning that it dynamically generates a new key for each packet. Used by WPA.

CCMP An AES-based encryption mechanism that is stronger than TKIP. Sometimes referred to as AES instead of CCMP. Used by WPA2.

Both TKIP and CCMP encryption are available for WPA+WPA2-PSK. Pre-shared key of 8 to 63 characters are required. Group Rekey Interval can be set up to 65536 seconds.

MESH Setup

This feature is just applied to the JetWave 2800-M Series.

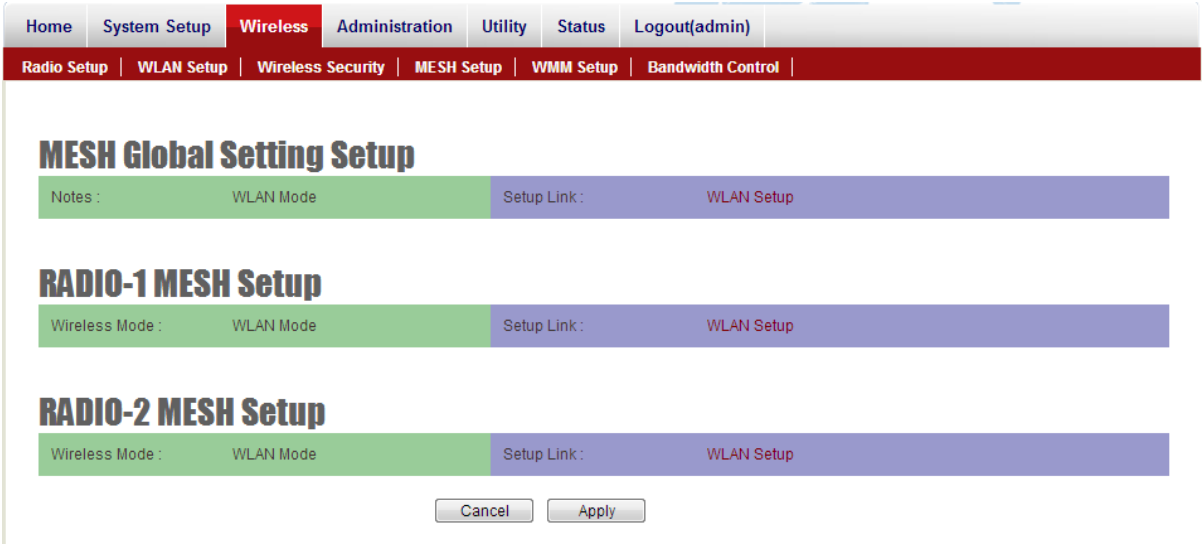
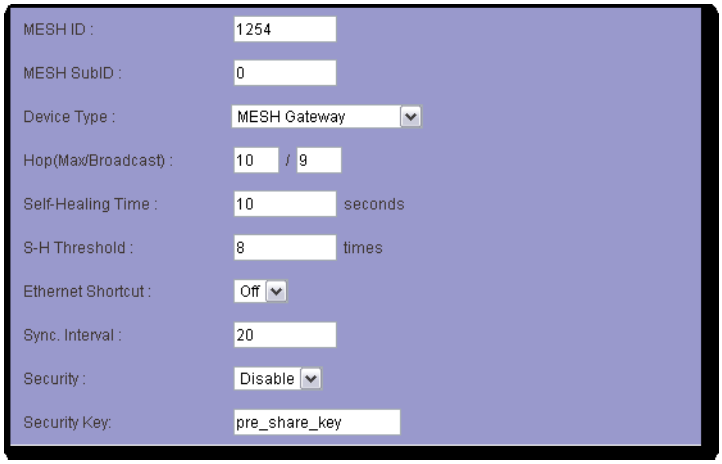


Figure 20 Wireless MESH Settings

The MESH Setup page contains two major setting category ： **MESH Global Setting Setup** and **RADIO MESH Setup**.

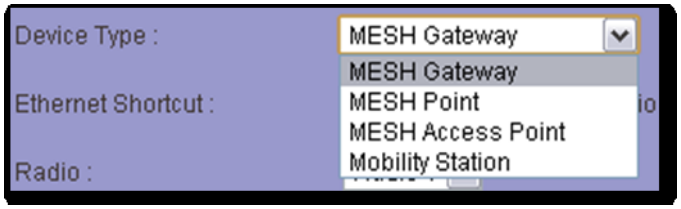
MESH Global Setting:

This page allows you to configure the global settings for MESH mode.


MESH ID : 1254
MESH SubID : 0
Device Type : MESH Gateway
Hop(Max/Broadcast) : 10 / 9
Self-Healing Time : 10 seconds
S-H Threshold : 8 times
Ethernet Shortcut : Off
Sync. Interval : 20
Security : Disable
Security Key: pre_share_key

MESH ID & SubID A five digit number to identify a specific MESH group. System will recognize a neighbor MESH device as the same group when both MESH ID and SubID are coincident.

Device Type: There are four MESH types optional for a device which is running MESH mode:



MESH Gateway

A gateway MESH node of a MESH group, it will control the registration of all MESH nodes in group. There must be a MESH Gateway node in a MESH group.

MESH Point

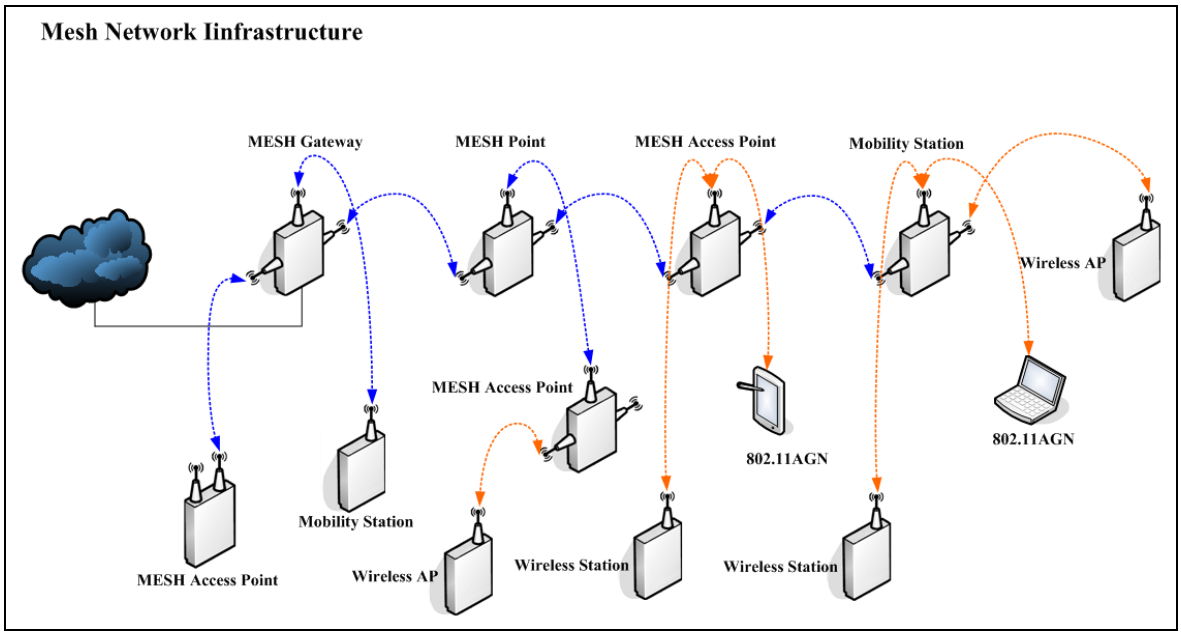
A MESH node relays data from all MESH neighbor nodes.

MESH Access Point

A MESH node who works not only relaying MESH backbone data flow but also service Mobility Station or 802.11AGN.

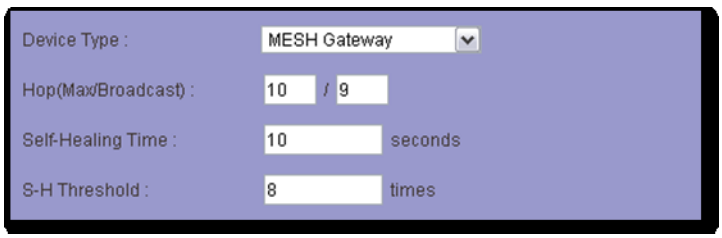
Mobility Station (Mobility license authenticate)

A MESH node that is able to do fast roaming between MESH Access Points under MESH group mobility service coverage.



MESH Gateway peculiar configuration

Following configurations are available only when device type is in MESH Gateway mode:

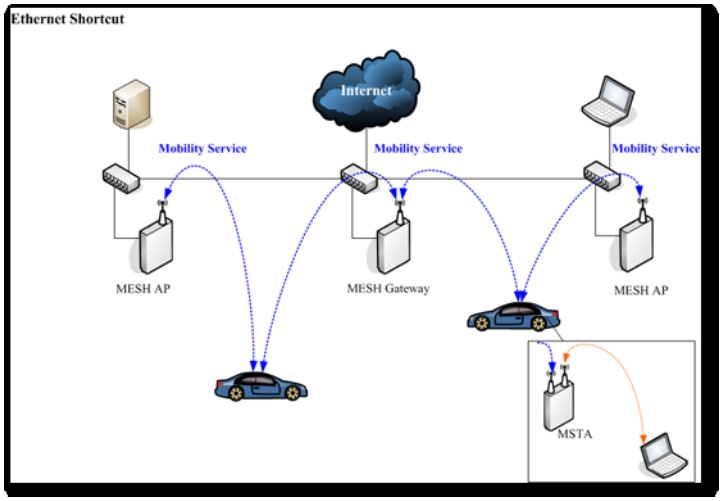


Hop(Max/Broadcast) The maximun hops count of MESH network scale and broadcast packet. (Only available on MESH Gateway)

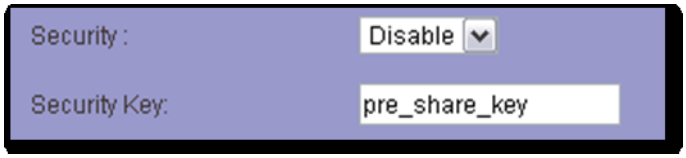
Self-Healing Time Each MESH node which is trying to join a MESH group must to register with MESH Gateway node. After the registration is confirmed, the MESH node can function its own role in group. Once a registered node is disconnected from group, the MESH system will wait for a period of time to delet registration information.

S-H Threshold To maintain a MESH network, MESH neighbors will keep sending management packet to update the best routing of data stream. Once the lossing management packet number is reaching a Self-Healing threshold number, the system will determine the link is loss.

Ethernet Shortcut A independent configuration for specific network MESH which all MESH nodes are connected by wire. The Ethernet Shortcut is limited by all radios on device should be ***Mobility Service*** in WLAN Mode.



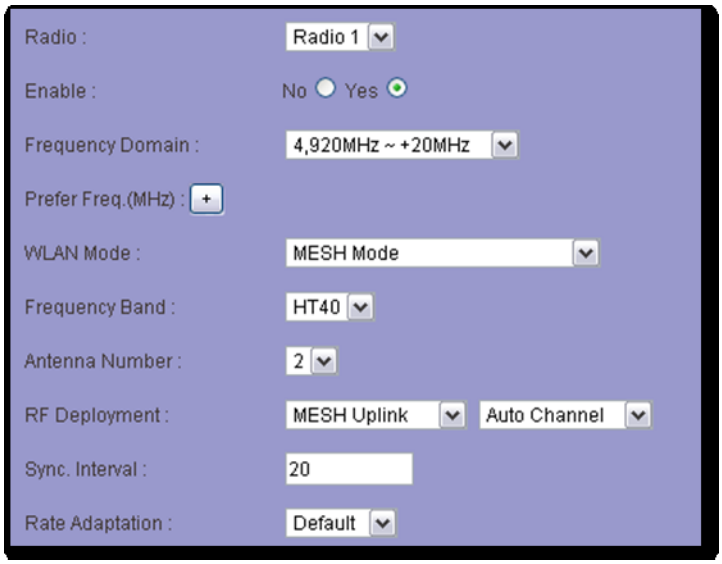
Security



MESH wireless link will be protected by a pre-share key setting, since the security is enabled in global MESH setting. This pre-share key setting should be synchronous in a MESH group.

MESH Radio Setup

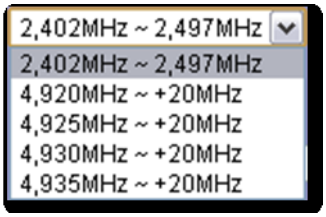
Following parameters are working on a specific radio interface which user chooses first in "Radio":



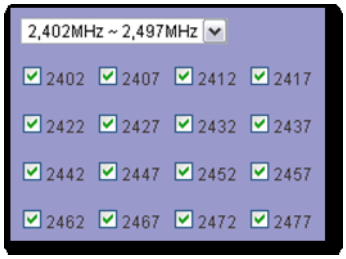
Radio Select a radio that you are going to configure.

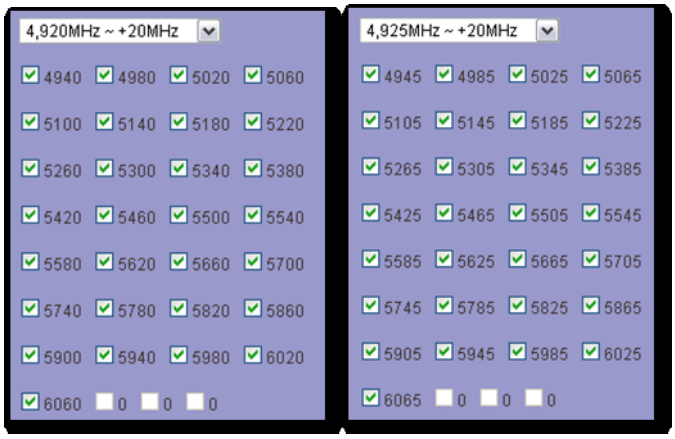
Enable Enable or disable the selected radio interface.

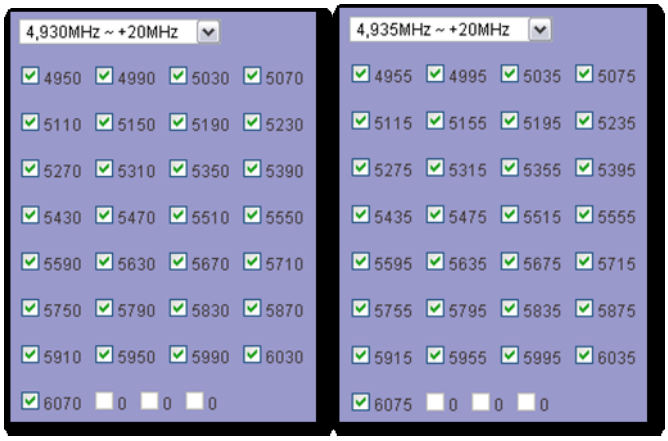
Frequency Domain There are 5 frequency domains optional for each radio interface.



Prefer Freq User can select few prefer frequencies for Mesh to scan instead of scan all available channels in frequency domain.







WLAN Mode Radios support “Access Point”, “Wireless Station”, “Access Point (WDS Support)”, “Wireless Station (WDS Support)”, “MESH Mode” and “Mobility Mode” mode to meet various network scenarios.

Frequency Band Choose a HT20 (channel bandwidth: 20MHz) or HT40 (channel bandwidth: 40MHz) radio frequency for signal transmission.

Antenna Number System completes 802.11n 1x1 1-steram and 2x2 2-stream for antenna attached. The maximum data link rate at 1-steram and 2-stream will be 130Mbps and 300Mbps.

RF Deployment 3 radio operating mode: “*Mesh Uplink*” “*Mesh Downlink*” and “*Mobility Service*” to define various radio behavior.

Sync. Interval To define a time period for Mesh nodes synchronizing path information to each other.

Rate Adaptation To define the up and down gradient of data rate when a data rate is auto or limited.

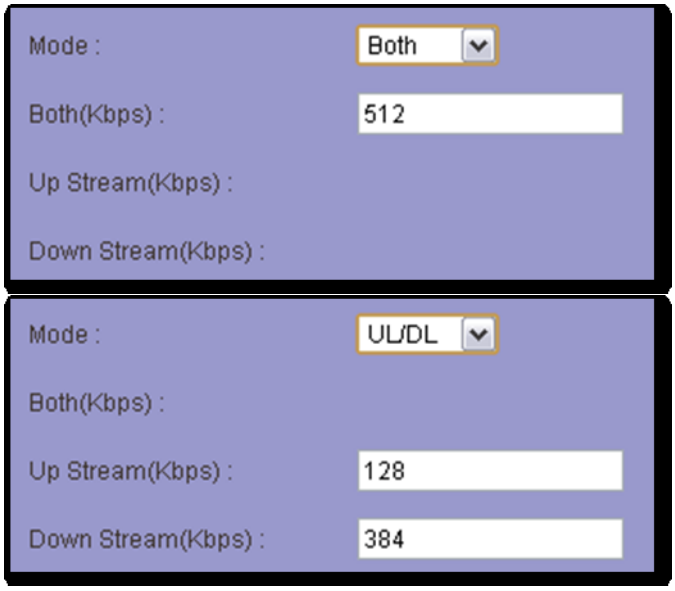
WMM Setup

Figure 21 Wireless WMM Settings

Wi-Fi Multimedia (WMM) is a Wi-Fi Alliance interoperability certification, based on the IEEE 802.11e standard. It provides basic Quality of service (QoS) features to IEEE 802.11 networks. WMM prioritizes traffic according to four Access Categories (AC) - voice, video, best effort, and background. It is suitable for simple applications that require QoS, such as Voice over IP (VoIP) on Wi-Fi phones (VoWLAN).

Bandwidth Control Profile Setup

Figure 22 Bandwidth Control Profile Setup



Profile ID There are 20 bandwidth control profiles can be configured for administration.

Mode Downstream and upstream data rates for subscriber or the client devices connecting to AP can be defined here. There are two bandwidth limit types in system. Both mode (UL+DL Limit Rate) consolidates download and upload rate of each single client connection. UL/DL mode

(UL/DL Limit Rate) specifies download and upload rate of client connections. Once the bandwidth limit is enabled, the limitation applies to all clients that connect to the AP.

Administration

JetWave 2800 series provides system management in menu partition: Administration, Which includes configuration file management, password maintaining and SNMP setup.

Management

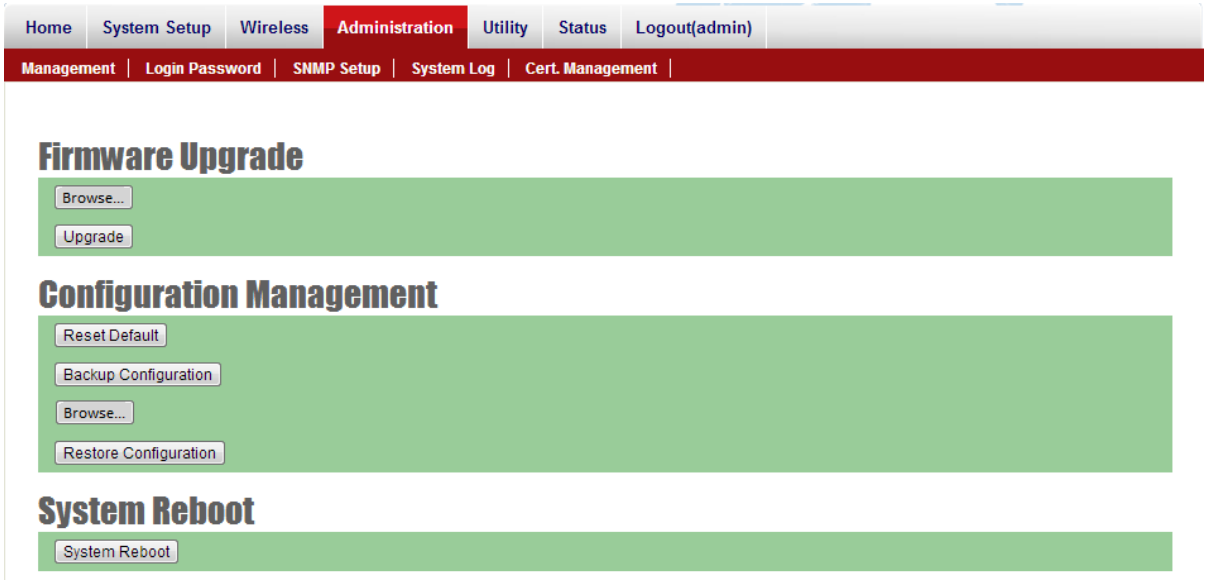


Figure 23 Administration

Firmware Upgrade Administrator can upload a new firmware file to device to keep system running by the latest bug fixed version of firmware.

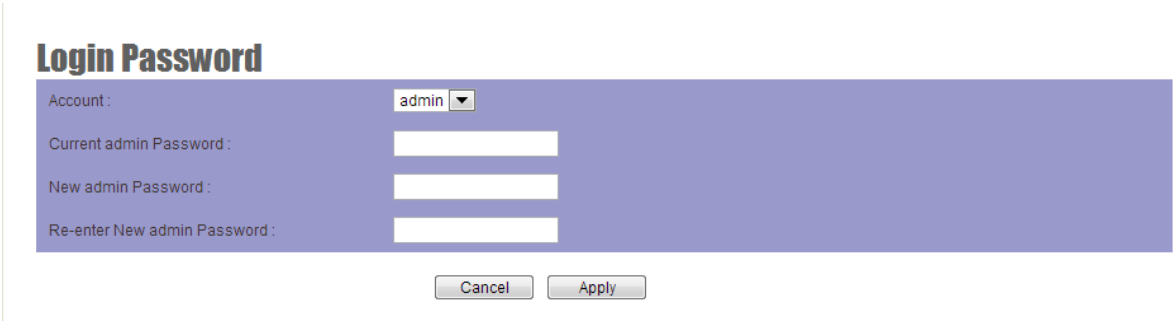
Configuration Management

Administrator would like to save the configuration of device to local PC by click “Backup Configuration”. Once hardware damage happened, administrator can “Restore Configuration” a saved configuration file to a new hardware without any reconfiguration.

“Reset Default” allows administrator to reload the system to factory default. After click Reset Default, the system will reboot automatically. You will see below screen. Please wait and connect it again by Default IP Address (192.168.1.1).

System Restart Click the “System Reboot” button will help to warm start the system.

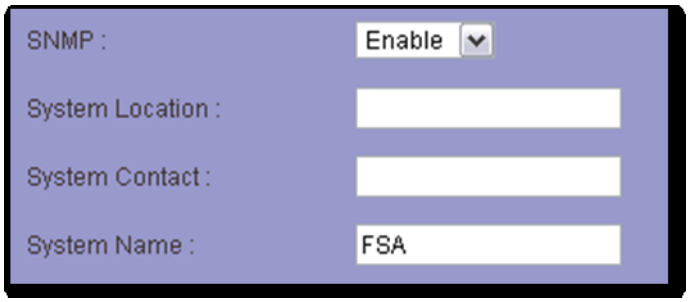
Login Password



System allows administrator to change the “admin” and “user” login password in menu partition: “Login Password”.

SNMP Setup

JetWave 2800 series support both SNMP V2 and V3. The configurable items show below:

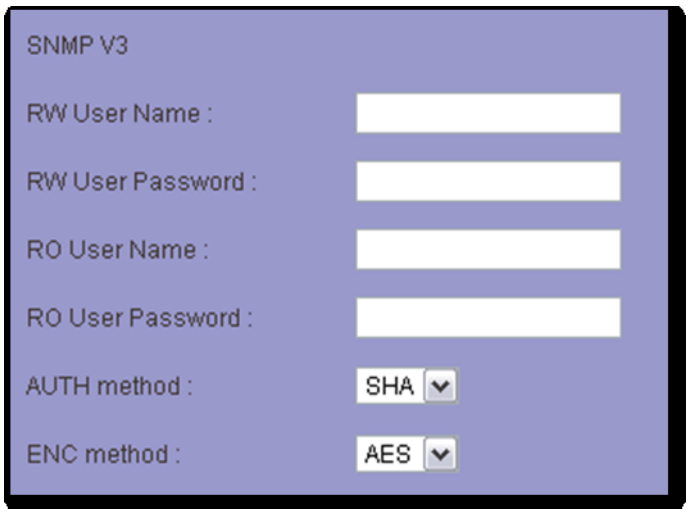


System Location A description notes the device location.

System Contact A description notes the device maintaining information.

System Name A description notes the given name of device.

SNMPV3



RW User Name Read and write authority login ID.

RW User Password Read and write authority login password.

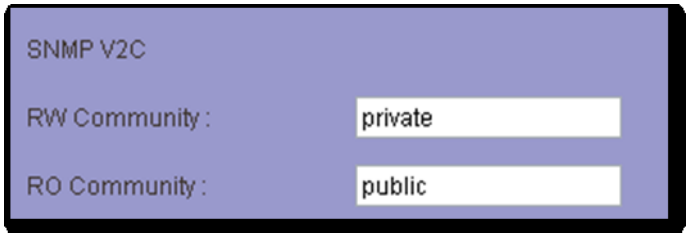
RO User Name Read only authority login ID.

RO User Password Read only authority login password.

AUTH method Choose the user authentication method.

ENC method Choose the SNMP data encryption method.

SNMP V2C



RW Community Read and write authority community stream.

RO Community Read only authority community stream.

System Log Setting

Figure 24 System Log Setting

Certificate Management

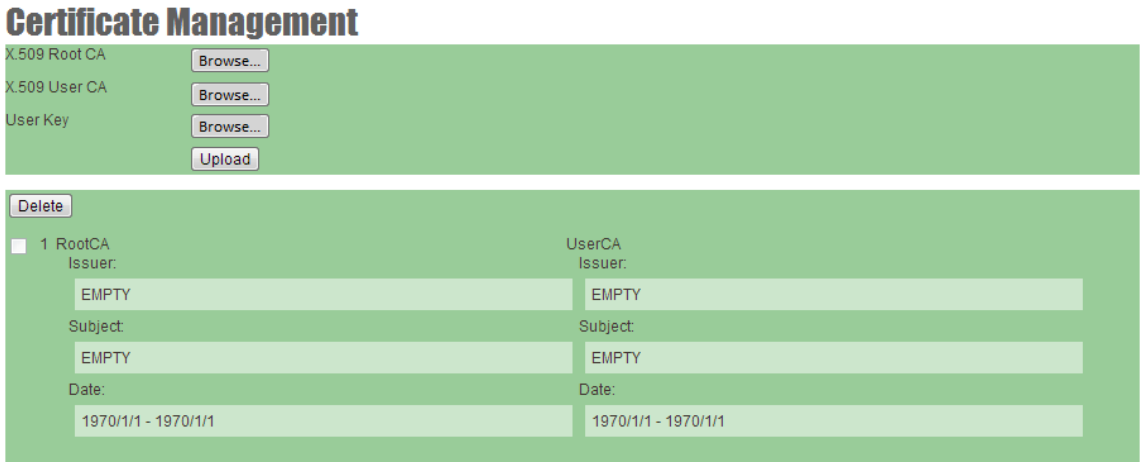


Figure 24 Certificate Management

Utility

JetWave 2800 series provide various software utilities helping administrator to do the network status survey and diagnostic.

Ping

“Ping” allows you to know the alive status of the remote unit easier.

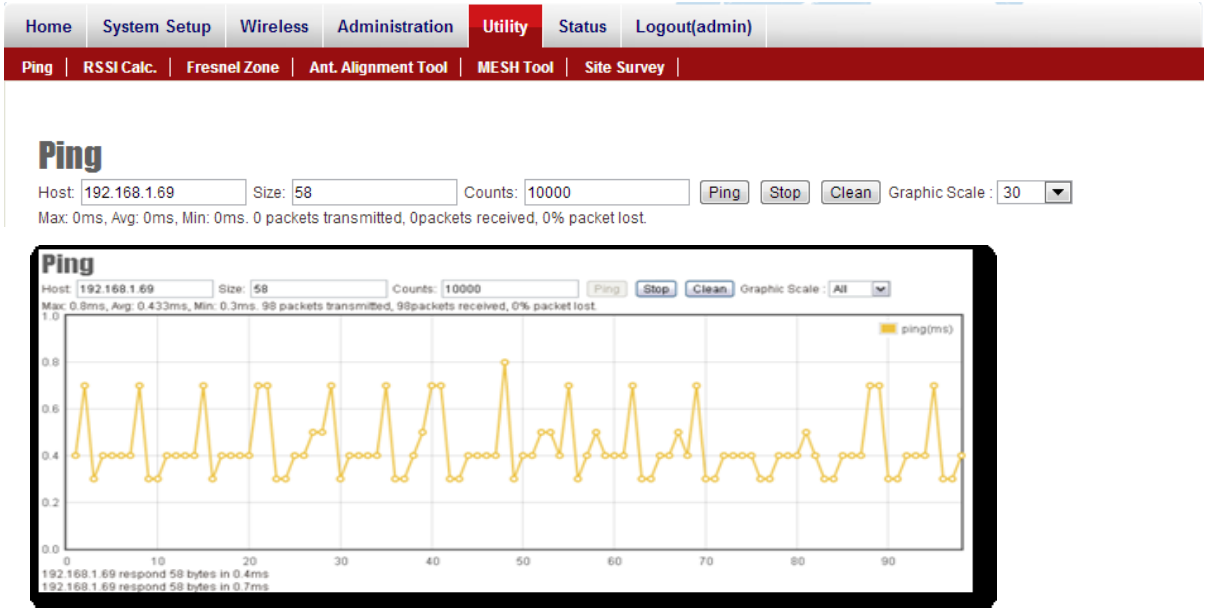

Home
System Setup
Wireless
Administration
Utility
Status
Logout(admin)
Ping | RSSI Calc. | Fresnel Zone | Ant. Alignment Tool | MESH Tool | Site Survey |
Ping
Host: 192.168.1.69 Size: 58 Counts: 10000 Ping Stop Clean Graphic Scale : 30
Max: 0ms, Avg: 0ms, Min: 0ms. 0 packets transmitted, 0packets received, 0% packet lost.
Ping
Host: 192.168.1.69 Size: 58 Counts: 10000 Ping Stop Clean Graphic Scale : All
Max: 0.8ms, Avg: 0.433ms, Min: 0.3ms. 98 packets transmitted, 98packets received, 0% packet lost.
ping(ms)
192.168.1.69 respond 58 bytes in 0.4ms
192.168.1.69 respond 58 bytes in 0.7ms

Figure 24 Ping Utility

Graphical display helps administrator to get the responding time changes of target IP address. Insert the remote **host IP address, packet size** and **number** in field than press ***Ping***, system will show the result on page. The result presenting can be adjusted by different choosing of graphic scale.

RSSI Calculator

Simple RSSI Calculator helps to estimate a possible RSSI and path loss by known device Tx power (transmission power), cable loss, antenna gain and frequency both transmitting and receiving side. Graphic displaying shows changes of path loss and RSSI.

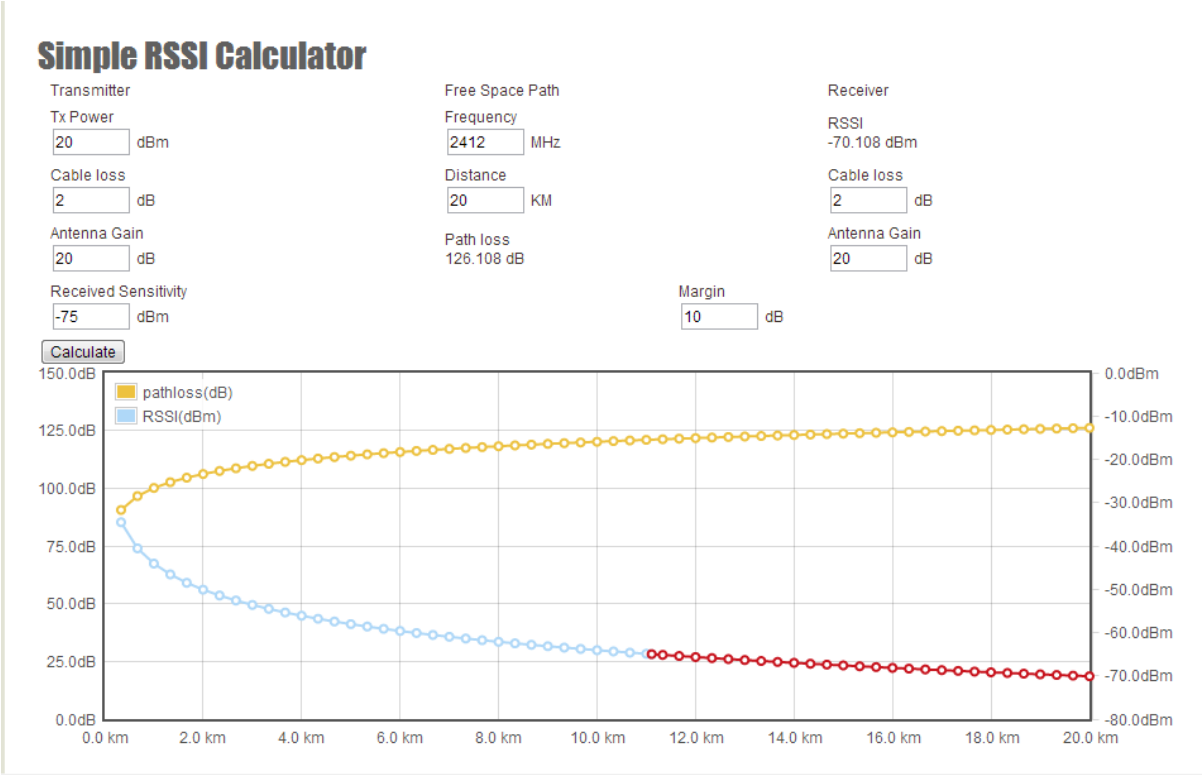


Figure 24 Simple RSSI Calculator

First Fresnel Zone Calculator

The First Fresnel Zone Calculator is a tool that helps you to estimate the possible obstruction from existing object between two devices before the wireless installation. An ***antenna angle*** calculation can also help you to aligning the vertical angle of the directional antenna.

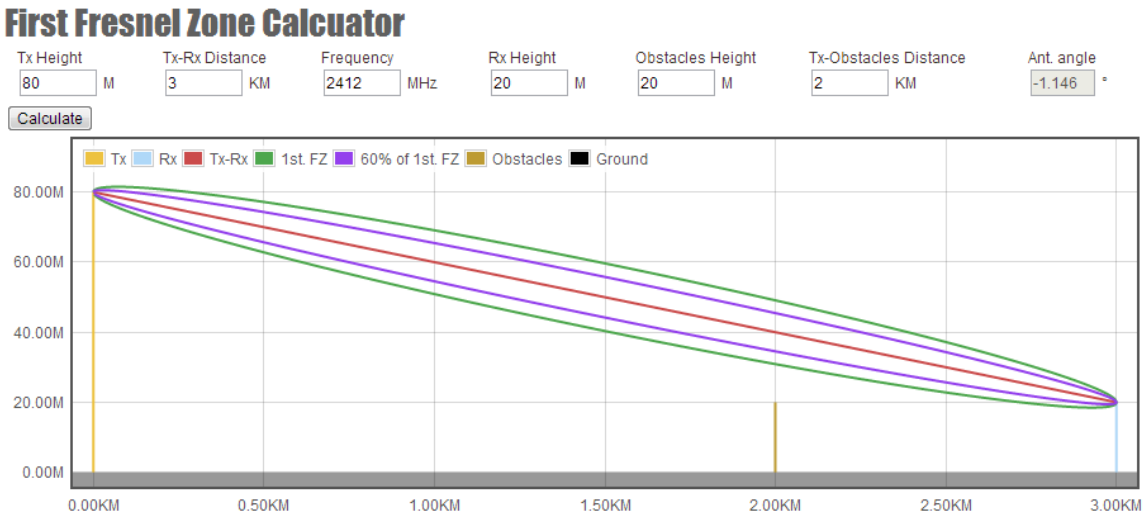


Figure 25 First Fresnel Zone Calculator

Antenna Alignment Tool

In order to lift efficiency of antenna aligning, JetWave 2800 series provide a software alignment tool helping the installers to align and check the antenna directions.

Antenna Alignment Tool will require triggering the function both access point and wireless station (AP Client) side. It means that both access point and wireless station (AP Client) side should be the JetWave 2800 series product, otherwise, the function doesn't get properly use.

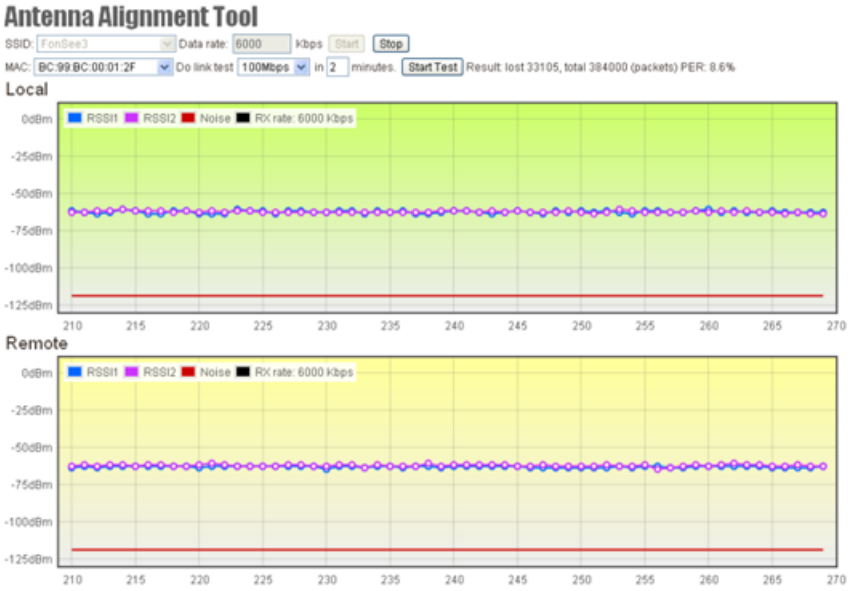


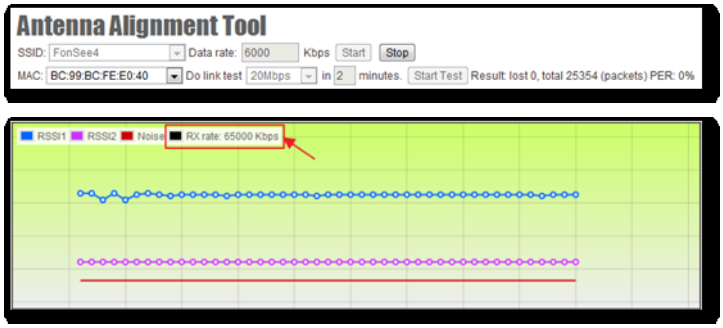
Figure 25 Antenna Alignment Tool

Choose the SSID which you are going to do the antenna aligning and click the ***Start*** button both access point and wireless station (AP Client) side to start the antenna alignment. You will able to see the RSSI changes in figure. Try to adjust the directional antenna's horizontal and vertical angle to get the best RSSI level.

Link Test

A ***Link Test*** is additional tool base on Antenna Alignment Tool active status. When you start the Antenna Alignment Tool, you may set a target throughput to active the ***Link Test*** to estimate the packet error rate.

Choose a target throughput and test duration than click Start Test button. System will generate a test data transmission to calculate the packet error rate.


Antenna Alignment Tool
SSID: FonSee4 Data rate: 6000 Kbps Start Stop
MAC: BC:99:BC:FE:E0:40 Do link test 20Mbps in 2 minutes. Start Test Result: lost 0, total 25354 (packets) PER: 0%
RSSI1 RSSI2 Noise RX rate: 65000 Kbps

An ***Rx rate*** shows the best data rate you can reach under the current RSSI level.

Link Test Tool can also help you to do the fine tuning of your antenna direction.

Site Survey

In wireless site survey, system provides a signal scan function to detect any available wireless signal around the AP. It will help AP installer to clarify the environment. Choose a radio interface which you are going to do the survey on device and click ***Scan*** button. After few seconds, system will show the APs around the device.

Figure 26 Site Survey

Status

System Information

System Information summarizes all the configuration and hardware information of the device. The information includes System Information, Network Addresses, Ethernet Port and Radio Cards Information.

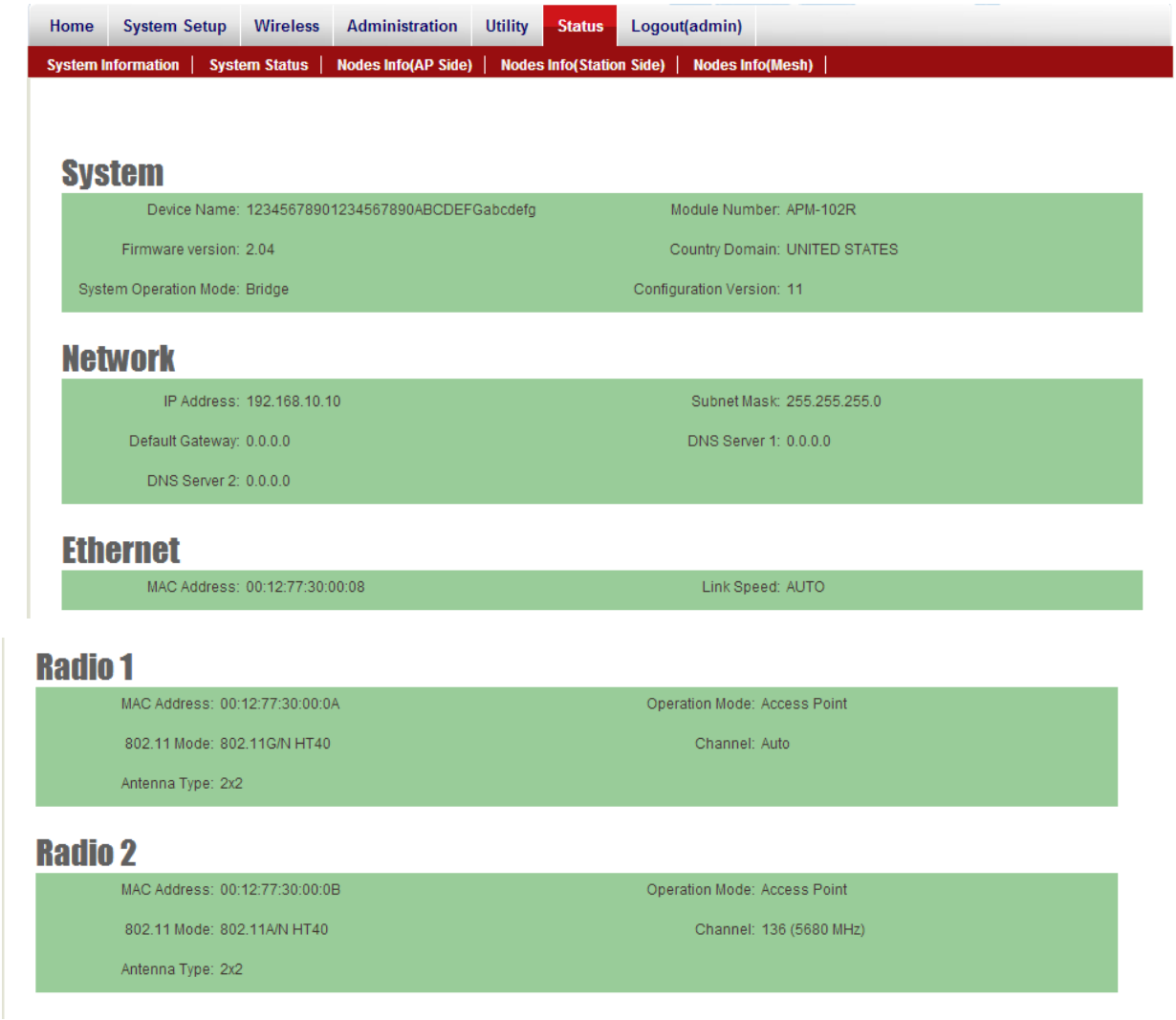


Figure 27 System Information

System Status

Figure 27 System Status

Real-time link statuses of all interfaces are shown in the menu.

System Up Time Display how long the AP has been operating since last boot-up.

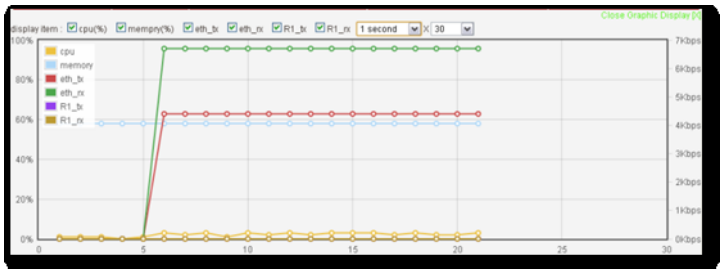
Interface Status Indicate the interface is ENABLE or DISABLE.

Link Rate Data Link Rate here indicates the maximum transmission rate available, and can be used as an indication of link quality.

Link Quality A Calculation of RSSI, signal and noise level to indicate the quality of the communication link in percentage.

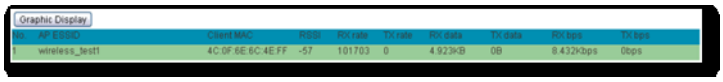
Channel The channel used by the wireless interface.

Signal Level A -70 ~ -50dBm signal level is recommended for a good connection. Too low a signal, the wireless link between AP and AC cannot be established. Too high a signal level, the power amplifier at the receiver might be forced to operate in saturation region and distorts the signal waveform.

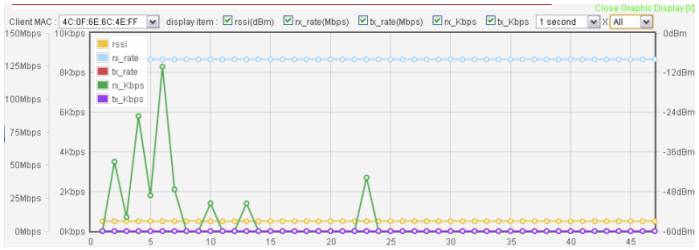


In order to help user's reading of the changes, system also provide a graphic interface to trace the items' changes. Click the ***Graphic Display*** button on the top left of the page, graphic mode will show on your browser.

Connecting Nodes Information



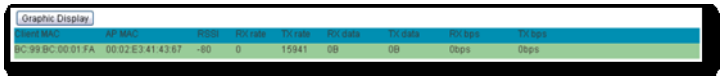
All the connecting clients' MAC address will be display in Connecting Nodes Information, including signal and data rate. The result shows information only when WLAN was configured as Access Point mode.



Graphic display is also available for observing the changes.

Figure 27 Connecting Nodes Information

Connecting AP Information



In the "Connecting AP Information" page, RSSI, Rx rate, Tx rate and etc. are provided for verification of wireless link status.

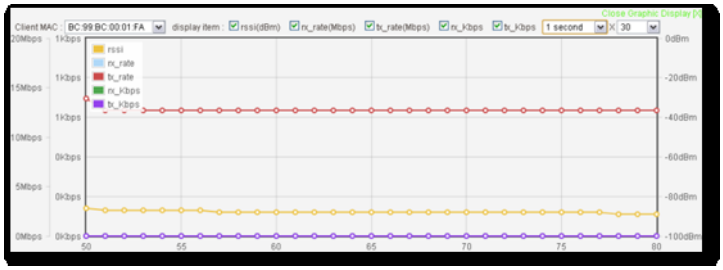


Figure 27 Connecting AP Information

Graphic display is also available for observing the changes.

Logout(admin)

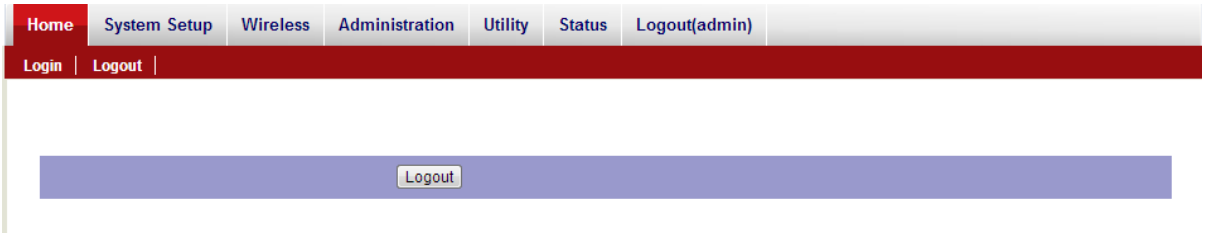


Figure 28 Logout

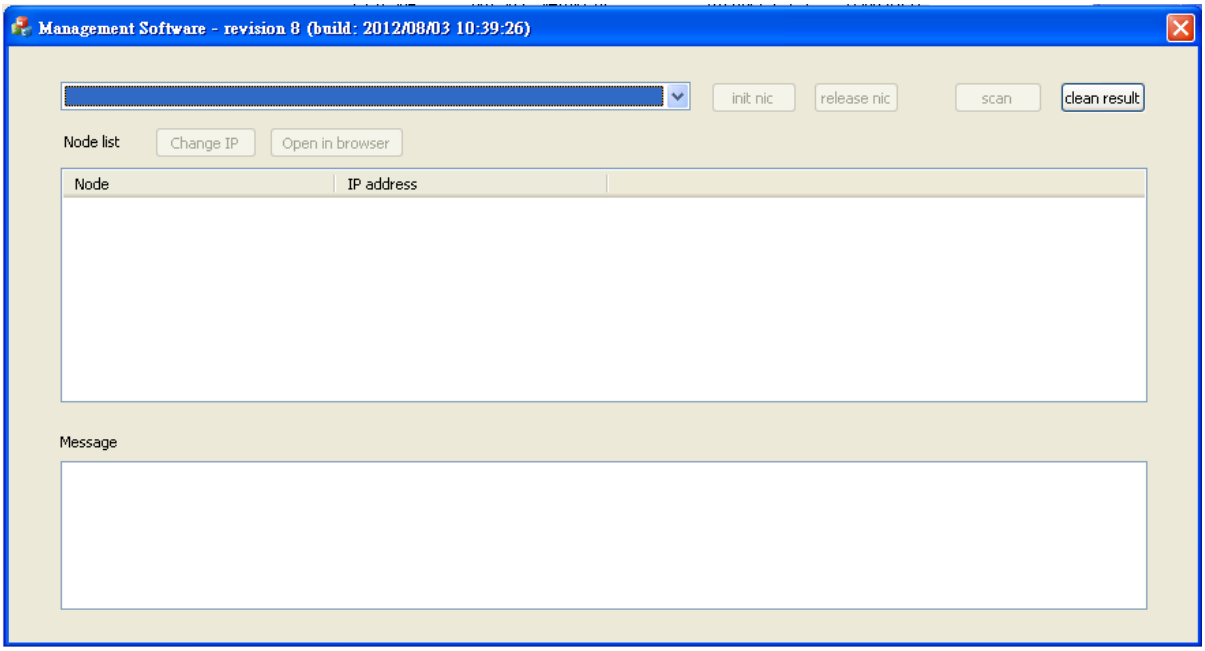
Chapter 4 Utility

JetWave 2800 Search Utility

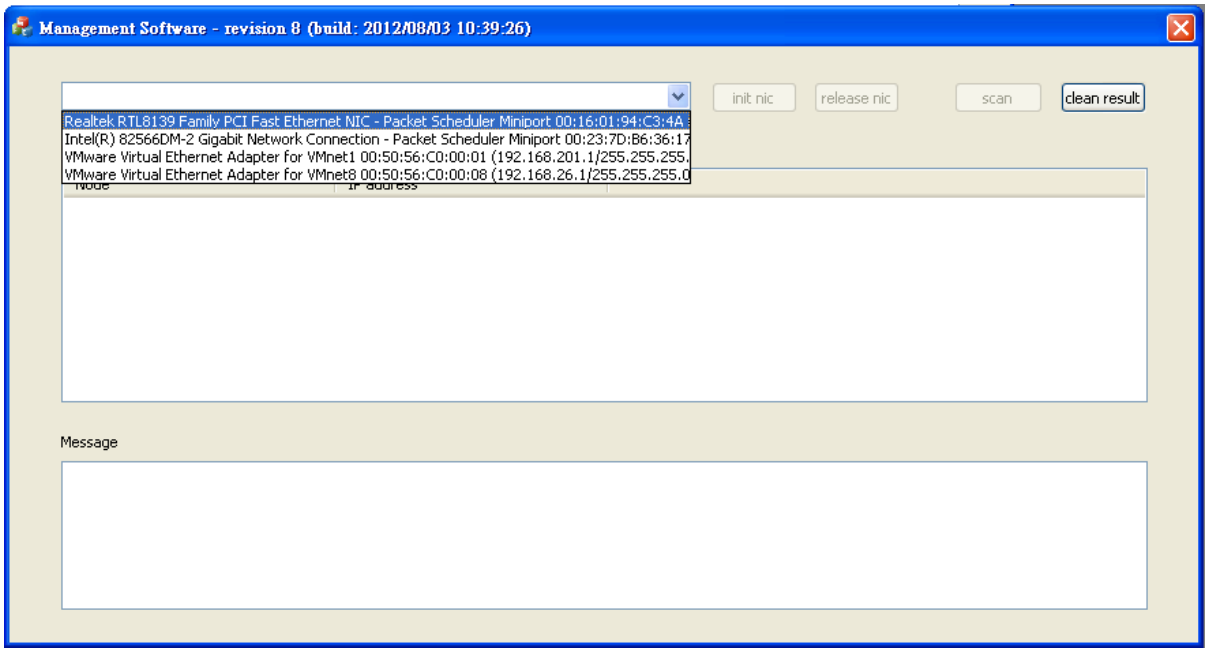
The utility provides you convenient tool to scan the network and then you can “**Change IP”** or open its Web GUI in “**Open in browser**”.

Before open the utility, please install the WinPcap program first.

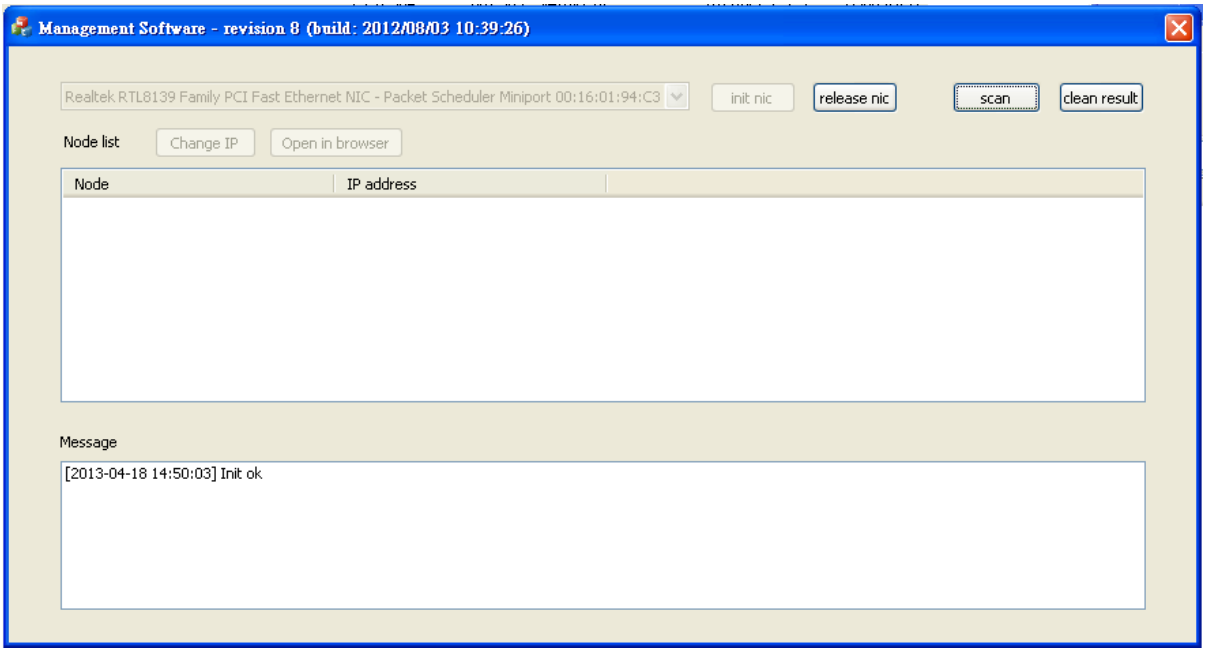
Step 1: Open the Utility



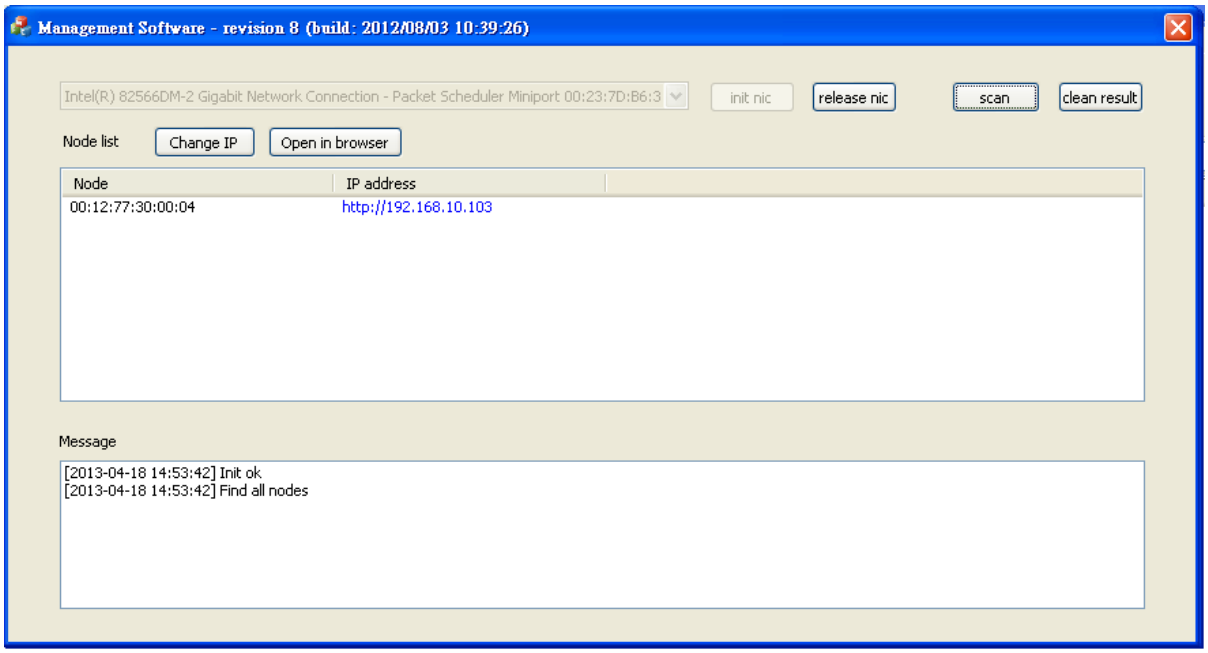
Step 2: Select the correct NIC (Network Interface Card) from the NIC list.


Management Software - revision 8 (build: 2012/08/03 10:39:26)
init nic
release nic
scan
clean result
Realtek RTL8139 Family PCI Fast Ethernet NIC - Packet Scheduler Miniport 00:16:01:94:C3:4A
Intel(R) 82566DM-2 Gigabit Network Connection - Packet Scheduler Miniport 00:23:7D:B6:36:17
VMware Virtual Ethernet Adapter for VMnet1 00:50:56:C0:00:01 (192.168.201.1/255.255.255.
VMware Virtual Ethernet Adapter for VMnet8 00:50:56:C0:00:08 (192.168.26.1/255.255.255.0
Message

Step 3: Click **“int. nic”**, and then you can see the “[Time] Init. ok” in the Message field.

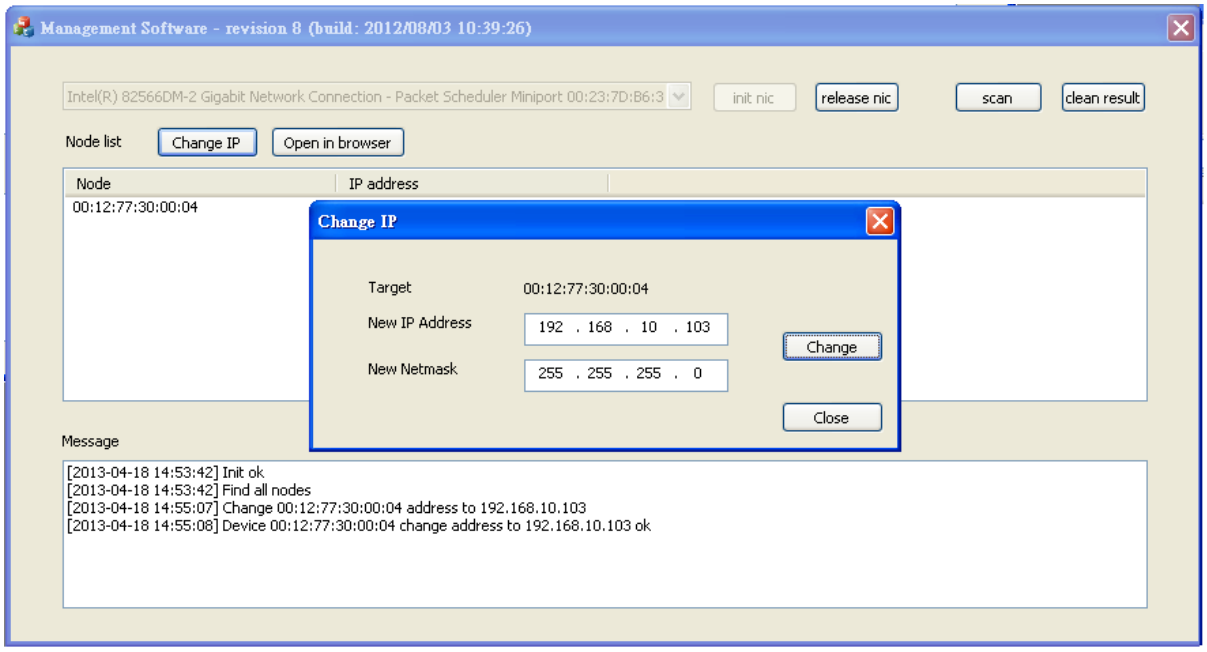


Step 4: Click “SCAN” to scan the network. The Nodes and its IP address can be found and listed in Node list. “Find all nodes” message means all the nodes are found and the process is terminated.



Step 5: After scan the network, there are 2 available commands, “**Change IP**” and “**Open in browser**”. Select the AP and click “Open in bowser”, then you can access the web management interface.

Select the AP and click “Change IP”, you can see the following popup window, “Change IP”. Change the IP address and Netmask, then click “Change” to apply the new settings.



Chapter 5 Troubleshooting

This chapter provides troubleshooting procedures for basic problems with the JetWave 2800. For warranty assistance, contact your service provider or distributor for the process.

Q 1. How to know the MAC address of JetWave 2800?

MAC Address distinguishes itself by the unique identity among network devices. There are two ways available to know it.

- Each device has a label posted on the back of the AP. There are MAC address for Ethernet and Radio cards. Please refer below.

Figure 11 MAC Address

- On the JetWave 2800 Web-based management interface, you can view the MAC Address from "**Status**" -> "**System Status**".

Q 2. What if I would like to reset the unit to default settings?

You may restore factory default settings in "**Management**" from "**Administration**".

Q 3. What if I would like to backup and retrieve my configuration settings?

You may do the backup by generating a configuration file or retrieve the settings you have backed up previously in "**Configuration Management**" from "**Administration**".

Q 4. What if I can not access the Web-based management interface?

Please check the followings:

- Check whether the power supply is OK; Try to power on the unit again.
- Check whether the IP address of PC is correct (in the same network segment as the unit);

- Login the unit via other browsers such as Firefox.
- Use JetWave Viewer to scan the AP and modify the IP address.

Q 5. What if the wireless connection is not stable after associating with an AP under wireless client mode?

- Since the JetWave 2800 comes without built-in directional antenna, it is recommended make the external antennas' face to the direction where the AP is to get the best connection quality.
- Check the "**Distance (x100m)**" setting in **"Radio Setup"**. Correct distance can help improve the transmission quality.
- In addition, you can start "**Site Survey**" in "**Utility**" to check the signal strength. If it is weak or unstable (The smaller the number is, the weaker the signal strength is.), please join other available AP for better connection.

Appendix A. ASCII

WEP can be configured with a 64-bit or 128-bit Shared Key (hexadecimal number or ACSII). As defined, hexadecimal number is represented by 0-9, A-F or a-f; ACSII is represented by 0-9, A-F, a-f or punctuation. Each one consists of two-digit hexadecimal.

Table 2 ACSII

ASCII Character	Hex Equivalent	ASCII Character	Hex Equivalent	ASCII Character	Hex Equivalent	ASCII Character	Hex Equivalent
!	21	9	39	Q	51	i	69
"	22	:	3A	R	52	j	6A
#	23	;	3B	S	53	k	6B
$	24	<	3C	T	54	l	6C
%	25	=	3D	U	55	m	6D
&	26	>	3E	V	56	n	6E
‘	27	?	3F	W	57	o	6F
(	28	@	40	X	58	p	70
)	29	A	41	Y	59	q	71
*	2A	B	42	Z	5A	r	72
+	2B	C	43	[	5B	s	73
,	2C	D	44	\	5C	t	74
-	2D	E	45	]	5D	u	75
.	2E	F	46	^	5E	v	76
/	2F	G	47	_	5F	w	77
0	30	H	48	`	60	x	78
1	31	I	49	a	61	y	79
2	32	J	4A	b	62	z	7A
3	33	K	4B	c	63	{	7B
4	34	L	4C	d	64	|	7C
5	35	M	4D	e	65	}	7D
6	36	N	4E	f	66	~	7E
7	37	O	4F	g	67		
8	38	P	50	h	68		

Revision History

Version	Description	Date	Editor
V1.0	1st formal release	Apr. 24, 2013	Orwell Hsieh